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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS

Projects on
ANIMAL HUSBANDRY
Part 4, Section a
Beef Cattle

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled May 1958 by

the State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued July 1958

FEDERAL-GRANT RESEARCH

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ANIMAL HUSBANDRY

Section a: Beef Cattle

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INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

BEEF CATTLE

BREEDING

Ala. Improvement of Beef Cattle of Alabama Through Breeding Methods. To (1) determine the effectiveness of selection for total performance in beef cattle; (2) develop criteria for evaluating and selecting breeding animals; and (3) determine the influence of heterosis on rate of gain, carcass quality and cow performance.
Anim. Husb. and Nutr. 525 (S-10) Coop. ARS

Ariz. Progeny Testing of Hereford Sires. To investigate productiveness of different Hereford sires as reflected in growth capacity of their progeny and to develop inbred lines that will be useful in improvement of this character.
Anim. Sci. 279 (W-1) Coop. ARS

Ark. Evaluation of Performance Records of Beef Cattle. To develop practical and adequate methods for identifying, evaluating and propagating genetic potential for beef production.
Anim. Indus. and Vet. Sci. 170 (S-10) Coop. ARS

Calif. Genetic Control of Hereditary Deficiencies in Beef Cattle with Special Emphasis on Dwarfism. To refine methods used for differentiating dwarf-carrier and dwarf-free mature horned Hereford bulls and lower the age at which the two genotypes can be recognized; and identify dwarf-carrier and dwarf-free genotypes in horned Hereford cows.
Anim. Husb., Vet. Sci. 1451 (W-1) Coop. ARS

Storrs (Conn) The Origin and Mode of Expression of Hereditary Characters in Fowl, with Special Reference to the Developmental Processes Which Produce Hereditary Variations and the Mode of Inheritance of New Genetic Factors. To determine (1) how new and desirable genetic traits can be produced in breeds of livestock; (2) way of hereditary transmission of new traits when they make their first appearance; (3) how such new traits are expressed during development; and (4) what new results can be obtained from the interaction of already existing genetic traits.
An. Genet. 129

Colo. A Study of Selection, Inbreeding, and the Crossing of Inbred Lines within the Hereford Breeds. To (1) study effect of intensive inbreeding on various traits in beef cattle; (2) study effect of crossing inbred lines and determine how inbred lines may best be used in producing maximum amount of hybrid vigor, and to provide information on the nature of heterosis in beef cattle; (3) study heritabilities of various traits of economic importance and genetic correlations between these traits; and (4) determine effect of inbreeding on the rate of blood antigen loss in Hereford cattle, extent the antigen picture can be used as an index of genetic diversity between inbred lines, use of inbred lines in providing test material for various means of detecting dwarfism, techniques most useful in performance testing, and endocrine pattern of performance tested cattle.

Anim. and Dairy Indus. 26 (W-1) Coop. ARS

Fla. Genetics of Dwarfism in Beef Cattle. To (1) describe and characterize various types of dwarfism manifested in beef cattle of various breeds; (2) investigate genetic relationship between more prevalent types of dwarfism; and (3) learn influence of genetic environment on expression of snorter dwarf gene.

Anim. Husb. 752 (S-10)

Ga. A Study of Grading, Crisscrossing and Rotation Crossing as Breeding Systems for Commercial Beef Production. To study (1) relative value of grading, crisscrossing and rotational crossing as breeding systems for commercial beef production; (2) heterotic effects in crosses between Angus and Polled Hereford breeds as compared to heterosis in crosses between these breeds and Santa Gertrudis; and (3) comparative value of Santa Gertrudis with Angus and Polled Herefords.

Anim. Husb. 209 (S-10) Coop. ARS

Ga. The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems; (2) how single and double crosses compare, and comparison with a random-bred population; (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population; (4) how many different populations should be used in a rotational program to get maximum economic performance; and (5) how performance of a rotation can be predicted from lines performance or single cross performance. (Mice).

Anim. Husb. 318

Hawaii The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop inbred lines of beef cattle that are useful in improvement of characters such as rate of gain, economy of gain, carcass quality, fertility and longevity; (2) develop effective breeding techniques for improving productiveness of beef cattle; and (3) investigate productiveness of existing lines of cattle.
Anim. Sci. 268 (W-1)

Idaho The Improvement of Beef Cattle Through the Application of Breeding Methods: (1) Linebreeding within the Hereford and Shorthorn Breeds; (2) By Testing Linebred Sires within the Various Lines which will be Developed. To develop lines of beef cattle that will result in improvement in such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality.
Anim. Husb. 280 (W-1) Coop. ARS

Ill. Improving Beef Cattle Through Breeding and Selection. To (1) develop strains having exceptional ability to grow or fatten on pasture and roughages; (2) maintain control line without selection under same conditions so as to measure progress and make heritability estimates; and (3) study relationship of various production traits of beef cattle.
Anim. Sci. 40-372 (NC-1)

Ind. Evaluation of New Concepts in Quantitative Genetics with Laboratory Organisms. To (1) utilize Triboliumcastaneum as biological check on results obtained with Drosophila melanogaster in comparing various breeding methods; (2) learn effectiveness of various breeding methods for improving performance of plateaued populations; (3) determine with Drosophila and Tribolium the relative effectiveness of a recently proposed modification of Reciprocal Selection; (4) determine genetic mechanism of heterosis or hybrid vigor in Drosophila by genetic fractionation of plateaued populations and single cross hybrids with "Marked Inversion Technique"; and (5) utilize Drosophila and Tribolium for biological evaluation of other new concepts arising in quantitative genetics.
Poultry Sci., Agr. Statis. 920 (NC-47) Coop. ARS

Iowa Improvement of Beef Cattle Through Breeding Methods. To establish inbred lines of Aberdeen Angus, Hereford, and Shorthorn cattle; develop methods of selection for improving lines, and determine possible intensity of inbreeding.
Anim. Husb. 1055 (NC-1) Coop. ARS

Kans. *Improvement of Beef Cattle Through Breeding Methods*. To (1) develop 2 lines of Shorthorns and maintain detailed records of their progressive development; (2) learn the practicability of inbreeding for establishing 2 lines of Shorthorns in a herd of 40 females of breeding age and the use of these in the improvement of beef cattle thru breeding methods; (3) study inheritance of the economic characters in beef cattle production and the interrelationships of these production traits; and (4) evaluate selection criteria and develop procedures for improving performance of beef cattle.
Anim. Husb. 286 (NC-1)

Ky. *A Performance and Progeny Testing Program for Bulls of the Beef Breeds*. To (1) use weaning weights, rate of gain, efficiency of gain, and conformation of beef bulls in developing index for predicting their value in breeding herd; (2) use experimental results and experience of participants as means of calling attention of beef breeders to variation in performance of purebred bulls of similar appearance both on feed and in breeding pen; and (3) breed relatively good and relatively poor bulls to uniform groups of cows to test heritability of rate and efficiency of gain in feeder calves.
Anim. Husb. 260 (S-10)

La. *Comparisons of Various Crossbred and High Grade Cattle Under Gulf Coast Conditions with Respect to Rate of Growth on Pasture, Fattening Ability, and Meat Quality of Steers*. To (1) develop types of beef cattle suited to conditions along the Gulf Coast; (2) determine efficiency of various breeds and crosses for economical beef production under Louisiana conditions; and (3) accumulate data which, when interpreted, will be of use to livestock breeders.
Anim. Indus. 605 (S-10)

Maine *Evaluation of Breeding and Feeding Methods for Beef Cattle Production in Maine*. To improve efficiency of production by learning average daily gain from weaning to 12 months of age, efficiency of feed utilization. Study systems of breeding using records of performance. Study live grades of beef. To study value of different rations composed of feeds readily available in Maine and the use of potato by-products and other by-product feeds.
Anim. Indus. 85

Md. A Study of the Productiveness of Purebred Beef Cattle in Maryland. To (1) study productiveness of beef cattle including rate and economy of gain, market type, carcass quality, fertility, longevity, etc.; (2) compare selection criteria with actual performance; (3) evaluate breeding techniques under varying conditions in purebred herds; and (4) attempt to produce beef cattle with superior productive capacities by linebreeding and selection.
Anim. Husb. C-14 (S-10)

Md. Effect of Early Weaning on the Duration of Maternal Influences in Beef Calves. To (1) attempt to develop a new technique for an earlier evaluation of feed lot performance, progeny testing and genetic evaluation of beef animals; (2) develop sound feeding and management practices for early weaned calves; and (3) evaluate calves' genetic ability to thrive under new systems of care.
Anim. Husb. C-14-a (S-10)

Md. Type Classification as an Aid in Selection of Beef Breeding Cattle. To determine value of type classification in beef cattle, i. e., heritability of beef type and production.
Anim. Husb. C-14-b (S-10)

Md. Group Versus Individual Feeding of Weaned Beef Calves. To (1) evaluate accuracy of group versus individually fed calves as technique in testing of sire-progeny groups; (2) study possibility of forecasting productiveness of beef calves by using single or combined measurements taken on live animals; (3) study value of scores taken on live animals in relation to forecasting their performance; (4) compare measurements and scores in order to search for objective methods of determining scores; and (5) study absolute and relative changes in measurements and scores from one age to another.
Anim. Husb. C-14-d (S-10)

Mich. The Effectiveness of Selection in Beef Cattle Improvement. To (1) establish measurements of most efficient beef cattle through study of rate of gain, efficiency of gain, breeding efficiency and carcass desirability; (2) develop and test methods of selection effective in accomplishing the above; (3) collect data on weaning weights, rate of gain, efficiency of gain and conformation to make possible a study of heritability of these characters; and (4) attempt to discover strains of cattle that excel in qualities listed under production characteristics.
Anim. Husb. 96 (NC-1)

Miss. *A Study to Determine the Breeding Worth of Inbred and Outbred Bulls from Various Sources*. To (1) compare growth rate, carcass quality, and maternal ability of progenies of bulls chosen as potentially superior sire; (2) develop high producing herd of cows using progeny of good producing bulls as replacements; and (3) determine effectiveness of selection index when used on heifers at weaning time.
Anim. Husb. 1 (S-10) Coop. ARS

Mo. *Pasture Improvement.--b. Relation of Type of Animal to Rate of Gain*. To determine the type of steer which makes the best gains from pasture. Immediately prior to beginning of grazing season, appraise the type and body conformation of each steer. Appraisal will be denoted by means of score cards to be formulated and photographs will be secured at start and end of grazing season.
Anim. Husb. 154-b

Mo. *Improvement of Beef Cattle Through Breeding*. To (1) develop more effective methods of selection for the improvement of performance in beef cattle; (2) develop more accurate and useful measurements of performance in beef cattle; (3) further test techniques of identifying "dwarf-free" and "dwarf-carrier" beef cattle; and (4) compare performance of "carrier" and "non-carrier" beef cattle.
Anim. Husb. 198 (NC-1)

Mont. *Recurrent Selection and Record of Performance Selection in Open and Closed Beef Cattle Herds*. To (1) establish inbred lines of registered Herefords, horned and polled, resulting in improving rate and economy of gain, fertility, nursing ability, longevity, and carcass quality; (2) establish an improved herd of registered Angus, select males on a high level of performance as indicated by standard record of performance procedures; (3) study feasibility of breeding for specific combining ability thru recurrent selection; (4) study topcrossing merit of bulls from Bozeman experimental lines and herds in comparison with industry sponsored herds; and (5) study utility of body for a guide in assigning visual or otherwise determined score.
Anim. Indus. 104 MS 873 (W-1) Coop. ARS

Nebr. Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) establish and evaluate selection criteria for improving performance in beef cattle; (2) determine inheritance of productive and deleterious characters, and methods for controlling them; (3) evaluate usefulness of various mating systems such as inbreeding, outbreeding, crossbreeding, or phenotypic assortative mating; (4) develop breeding procedures for improving performance of beef cattle; (5) develop lines of cattle with improved breeding value for such characters as rate and economy of gain, fertility, nursing ability and carcass quality; and (6) evaluate usefulness of existing stocks of beef cattle and their adaptability in various areas under different systems of management.

Anim. Husb. 334 (NC-1) Coop. ARS

Nev. The Effect of Environment on Selection for Traits of Economic Importance, The Relative Value of Several Selection Criteria, and Reproductive Studies in Range Beef Cattle. To determine (1) effect of environment on effectiveness of selection for several traits of economic importance in range beef cattle; (2) evaluate genetic-environmental interaction between area and method of production and several traits of economic importance in range beef cattle; (3) relative importance of rate of gain, economy of gain and a selection index based on overall merit as selection criteria for range beef cattle, including: additional criteria to be developed and studied, study of measures of "efficiency of food utilization" and attempts to develop more satisfactory measures, and growth and development studies in range cattle; and (4) effect of reproductive efficiency on selection in range cattle, including: attempts to develop a practicable early-pregnancy diagnostic method, relation of time or rate of maturation and fertility, attempts to determine and evaluate causes of infertility in range cattle, and attempts to develop a practicable method of synchronizing estrous cycle in range cattle.

Anim. Husb., Agron, and Range Mgt., Vet. Sci., Chem. 77 (W-1)

N. Mex. Breeding Beef Cattle for Southwestern Ranges. To (1) determine or gather more information on the heritability of weight and grade at weaning, at yearling, and at maturity; (2) continue efforts to determine heritability of type and size, measure relative influence of sire and dam on offspring, determine feasibility of mating compact cows with large bull and large cows with compact bulls, and continue observations on hardiness, longevity, and reproductive efficiency of cows of two types; (3) gain more information on the heritability of carcass yield and grade; (4) develop methods of establishing lines of cattle free from dwarf genes, and establish a line of purebred Hereford cattle free of dwarf gene, or, if this proves impossible, a line in which the dwarf gene has a low frequency; (5) gain more information on heritability of type or form; (6) study influence of size and type of cattle on feed use and feed lot performance; (7) establish procedures or breeding plans to improve range cattle by making use of information gained in first two objectives; and (8) develop a line of purebred Hereford cattle adapted to range production in the Southwest.

Anim. Husb. 65 (W-1) Coop. ARS

N. C. The Use of Record of Performance Selection Program for Improving Beef Cattle. To (1) obtain information for objective appraisal of breeding animals in production of market animals; (2) learn management practices to produce high market value feeder calves; and (3) assist cooperators in beef herd improvement, thru selection of breeding animals, to work with cooperating producers in securing data and in evaluating certain farm practices.

Anim. Indus. 32

N. C. The Improvement of Beef Cattle Through Breeding Methods. To develop and evaluate selection criteria for the improvement of productive efficiency and market quality of beef cattle.

Anim. Indus. 74 (S-10) Coop. ARS

N. Dak. Sugar Metabolism Studies in Dwarf and Normal Cattle. To (1) study variations in sugar metabolism in cattle; and (2) learn if variations are associated with anatomical characteristics peculiar to dwarfs. Blood sugar and urine sugar levels will be determined on all experimental cattle under normal conditions by: fasting, sodium propionate feeding, insulin injection, glucose injection, adrenalin injection, injection of pituitary hormones.

Anim. Husb., Vet. Sci. 7-6 (NC-1)

Ohio

Relationships Between Body Conformation, Rate of Gain, and Carcass Value as Measured in a Breeding Herd of Hereford Cattle. To (1) study relationships between various body measurements, rate of gain, and carcass value in a herd of Herefords; (2) correlate gross carcass measurements with detailed slaughter and carcass cut-out data; (3) learn the heritability of cross-sectional area of longissimus dorsi muscle as measured in carcasses; (4) compare progeny of long bodied and of compact, deep bodied bulls as to their ability to make rapid, economical gains and produce carcasses containing a high percentage of primal cuts and edible portions; and (5) develop a line of fast gaining, superior lean-meat producing Herefords and evaluate methods used in development.

Anim. Sci. 113 (NC-1)

Okla.

The Improvement of Beef Cattle by the Application of Breeding Methods. To (1) develop practical measures of performance and selection procedures for beef cattle handled under range conditions; (2) develop improved beef cattle by selection and mild inbreeding; (3) compare breeding and feeding performance of small and large type cattle; and (4) study individual variation and heritability of economically important traits in beef cattle.

Anim. Husb. 670 (NC-1) Coop. ARS

Oreg.

Improvement of Beef Cattle Through Breeding Methods, Using Basic Physiological Differences in Rate and Efficiency of Gains. To (1) develop a selection index based on suckling rate of gain, gains during feed test, feed efficiency and score conformation; (2) determine growth pattern of calves differing in genetic growth potential; (3) determine nitrogenous and carbonaceous blood and urine constituents of calves at definite weights; (4) determine heritability of suckling ability of cows, growth rate of calves, feed efficiency, scores, blood and urine constituents, etc.; (5) relate score and body measurements to rate of gain, feed efficiency, and body composition as determined in live animal and in carcass; (6) learn if animals can be selected effectively for rate and efficiency of gains on a roughage ration; (7) develop beef lines thru rigid selection and inbreeding and test value for improving production in top crossing; and (8) determine digestion coefficient at definite body weights and relate ability to gains.

Anim. Husb. 1 (W-1) Coop. ARS

S. C. The Use of Purebred and Crossbred Cows in the Production of Slaughter Calves. To learn birth and weaning weights, market grades, carcass grades and dressing percentages of fat calves sired by a Shorthorn bull and Purebred Angus cows and crossbred cows from Brahman X Hereford, Brahman X Angus, and Hereford X Angus.
Anim. Husb. 25 (S-10)

S. Dak. The Improvement of Beef Cattle Through Breeding. To (1) study the usefulness of inbreeding and subsequent crossing as a mating system; (2) study the methods of selection to be used independently and in conjunction with first objective; (3) investigate the productiveness of existing beef cattle; (4) test on farm bulls produced under breeding program; (5) compare bulls produced by different mating systems or selected on different bases when bred to comparable groups of cows; and (6) study various characteristics of heterozygous and normal beef cattle in an attempt to find a simple means of distinguishing between them.
Anim. Husb. 167 (NC-1) Coop. ARS

Tenn. The Improvement of the Producing Ability of Beef Cattle. To (1) develop lines, crosses, or combinations of beef cattle that will make most efficient use of Tennessee pastures and forages and result in an improvement of rate and economy of gain, carcass quality, fertility and longevity; (2) develop effective breeding techniques for improving productiveness of existing lines; (3) investigate productiveness of existing lines; and (4) test effect of different levels of nutrition on development of type, conformation, fertility, and longevity.
Anim. Husb. 61 (S-10) Coop. ARS

Tenn. The Detection of Animals Heterozygous for Recessive Bovine Dwarfism. To investigate methods of identifying at young ages animals heterozygous for recessive bovine dwarfism.
Anim. Husb. 65 (S-10) Coop. ARS

Tex. The Improvement of Production and Adaptation of Beef Cattle within Pure Breeds and Certain of Their Crosses Through Breeding Methods. To (1) improve rate of gain by selection based on weaning weight and gain in feed lot; (2) improve gain in Brahman by crossing with Hereford and continue backcrossing to Brahman; (3) evaluate cattle with regard to adaptability to environment, especially in summer; (4) improve production in summer by selection based on individual summer gain; (5) learn extent of carcass differences within breeds and heritability of differences; (6) evaluate new crosses and breeds with respect to carcass merit; (7) learn value of carcasses of culled bulls; (8) evaluate significance of hybrid vigor in hybrids and their offspring in regard to gaining, carcass value, fertility, etc.; and (9) make available breeding animals of proven superiority.
Anim. Husb. 650 (S-10) Coop. ARS

Tex. Biochemical and Physiological Anomalies of Bovine Dwarfism and Their Use in Detection of Heterozygotes. To (1) detect biochemical and physiological anomalies associated with bovine dwarfism, in an attempt to identify metabolic defect(s) causing dwarfism; (2) learn extent to which biochemical and physiological factors which are anomalous in dwarfs vary in normal animals; (3) learn usefulness of variation of these factors in distinguishing between normal carriers and non-carriers of the genes conditioning dwarfism; and (4) use these factors in further study of mode of inheritance of dwarfism in beef cattle.
Biochem. and Nutr., Anim. Husb. 959 (S-10) Coop. ARS

Utah The Development of Breeding Techniques and Selection Criteria for Improvement of Economically Important Characteristics in Hereford and Shorthorn Cattle. To develop (1) three lines among Hereford and Shorthorns useful in improving rate of gain, efficiency of gain, carcass quality, fertility, and milking ability; (2) selection criteria and selection and breeding techniques effective in derivation of productive lines of beef cattle; (3) more accurate, simple methods of evaluating rate and efficiency of gains; and (4) certain biochemical techniques and learn their value for identifying genotypes in beef cattle.
Anim. Husb. 280 (W-1) Coop. ARS

Va. Heterosis From Crosses Among British Breeds of Beef Cattle. To measure heterosis obtained from crosses among Angus, Hereford, and Shorthorn beef cattle as shown by growth rate, fattening ability and carcass quality up to approximately 20 months of age; and production ability of dams.

Anim. Husb. 93901 (S-10) Coop. ARS

Wash. Improvement of Beef Cattle by Selection and Milk Inbreeding within Lines of the Hereford, Angus and Shorthorn Breeds. To (1) develop lines of established beef cattle breeds useful in improving rate of gain, economy of gain, carcass composition, fertility, longevity, and type; (2) develop selection criteria, and selection and breeding techniques effective in derivation of productive lines; and (3) develop method of identifying economic characteristics in young stock.

Anim. Husb. 788 (W-1)

Wis. The Importance of Genetic and Environmental Influence on Characteristics of Economic Value in Beef Cattle. To (1) establish for beef cattle the relative effect of genetic and environmental influences on characteristics of economic importance which may be used in the development of a selection index; and (2) analyze physiological relationship between these important characteristics.

Anim. Husb., Genet. 871 (NC-1)

Wyo. Criteria for Improving Effectiveness of Selection in Beef Cattle. To (1) learn relation of body form development as determined by body scores and measurements to production factors; (2) develop selection criteria from carcass evaluation techniques and in vivo determination of lean-fat ratio; (3) learn effectiveness of different selection and breeding systems on genetic improvement of productive traits; and (4) further study and learn heritability estimates and genetic and phenotypic correlations of production traits from data collected.

Anim. Prod. 655 (W-1) Coop. ARS

Wyo. A Study of the Significance of Head Form in Beef Cattle. To study (1) pattern of head form development in young cattle; (2) association, if any, between head form development, dwarf factor, and other economic factors as early maturity, weight for age, and rate and efficiency of gain in beef cattle; (3) inheritance of head form.

Anim. Prod. 610 (W-1)

PHYSIOLOGY

General Physiology

Ariz. The Effects of Climatic and Nutritional Stresses on Growth and Productivity of Range Cattle. To (1) establish methods of accurately measuring individual animal heat tolerance and learn effect of high environmental temperatures on growth and development of beef cattle; and (2) learn effects of nutritional stress early in postnatal life on subsequent growth and lifetime production of range cattle.
Anim. Sci. 411 (W-46) Coop. ARS

Calif. Physiology of the Domestic Animals. To study the physiology of (1) reproduction; (2) ruminant stomach; and (3) the parathyroid gland as a control mechanism for the calcium level of the blood.
Anim. Husb. 941

Calif. Steroid Metabolism in Domestic Animals. Elucidation of fundamental aspects of steroid physiology in domestic animals, especially in ruminants. Development of rational therapeutic measures in endocrine disfunction and/or other metabolic derangements manifested via altered steroid physiology.
Anim. Husb. 1659

Calif. The Effect of Nutrient Restriction on Growth and Body Composition of Sheep and Cattle. To (1) adopt routine use of antipyrine for learning body composition as a criteria in evaluation of stresses resulting from nutrient restrictions; (2) learn effect of different degrees of total, energy, and protein starvation on over-all efficiency of production from sheep and cattle; and (3) develop methods of assessing feasible degree and length of nutrient restriction which is commensurate with economical production of range cattle and sheep.
Anim. Husb. 1722 (W-46) Coop. USDA

Colo. The Effect of Altitude on Growth and Production of Livestock. To (1) learn effects of constant and changing altitude on growth and production of livestock; and (2) devise methods for alleviating undesirable physiological responses produced by altitude effects on livestock.
Anim. and Dairy Indus. 238 (W-46)

Idaho

Environmental Stresses Affecting Growth Patterns in Beef Cattle During the Embryonic Development and Subsequent Nursing. To (1) learn specific effect of environmental stresses on overall growth of embryo of cattle with emphasis on factors of space; and (2) establish rate of contribution of some of these environmental stresses on growth rate of calf and on specific organs and sections of the body between birth and weaning.

Anim. Husb. 309 (W-46)

La.

The Effect of Certain Management Practices and Controlled Stress on the Physiological Response of Dairy Animals. To determine (1) value of succulent feeds, such as silage and irrigated pasture, in maintaining high milk production during summer; and (2) effect of various management practices on physiological response of dairy animals when subjected to controlled temperatures ranging from 60°F to 105°F at controlled humidity.

Dairy 540 Coop. ARS

Md.

Relationship of the Hypophyseal Growth Hormone and of the Pituitary-Adrenal System to the Productive Capacity of Dairy Cattle for Reproduction and Milk Production. To establish (1) importance of adrenal and pituitary-adrenal system for reproduction, milk production, normal health of dairy cattle and ability of cows to withstand stress, especially during parturient period; (2) mode of action of growth hormone in increasing milk production.

Dairy Indus. G-46 (NE-41)

Mich.

Hormone Studies Related to the Physiology of Domestic Animals Including Investigations with Radioactive Isotopes. To study (1) thyroid physiology of laboratory and domestic animals; (2) nutritional hormonal interrelationships during growth and reproduction; (3) effects of hormones on growth, maturation, and reproduction; (4) relation of hormones to milk secretion; and (5) metabolism of hormones in the animal body.

Poultry Husb., Vet. Med., Anim. Husb. 25

Mich.

Effects of Hormonal Imbalances on Nutritional Requirements. To determine the effects on specific dietary needs resulting from (1) administering large doses of cortisone, estrogens, androgens, thyroid-active substances, insulin and growth hormone; (2) removing adrenals, gonads, thyroids; or (3) from treatment with thiouracil or alloxan. It is hoped that these studies will further elucidate interactions between hormones and dietary factors in the body so that both may be used with greater efficacy and safety in the future. (Rats, Mice and Chickens).

Poultry Husb., Vet. Med. 105

Mo. Influence of Climatic Factors on Milk Production, Growth and Related Physiological Reactions.--b. The Effects of Environmental Temperature on Growth and Related Reactions in Heifers, Birth to One Year. To study effects of three environmental temperatures: (1) optimum, 50°F. plus or minus 5°F.; (2) hot weather with daily range of 75°F. to 95°F. daily; and (3) natural outdoor conditions.
Dairy Husb. 125 Coop. ARS

Nebr. The Relationship Between Changes in Certain Blood Characters and Physiologic Function (Growth Rate, Productive Ability and Feed Consumption). To (1) determine changes in levels of certain constituents of blood with age, growth, pregnancy and productive ability; and (2) if significant relationships exist between blood constituent levels and physiologic function, to study prediction value of these blood constituent levels to future productive ability, and use physiological range of blood constituents as criterion for judging optimal dosage in administration of hormones, antibodies, etc. to obtain greater efficiency of productive abilities of animals and without serious detriment to the animal.
Dairy Husb. 452

Nev. The Effect of Water Intake on Growth and Production of Range Livestock. To study (1) effect of mineralized water on growth and feed utilization of range livestock; and (2) effect of water privation on growth and feed utilization of range livestock.
Anim. Husb. 40 (W-46) Coop. ARS

N. Mex. Effect of Nutrient Restriction on Adaptability of Cattle to the Semi-Arid Ranges of the Southwest. To learn the effect of (1) nutrient restriction, following weaning, on growth of heifers; and (2) altered growth due to nutrient restriction in early life on lifetime production.
Anim. Husb. 81 (W-46) Coop. ARS

Minn. The Effect of Maternal Nutrition on Development, Growth, and Performance of the Young. Small laboratory animals will be used for initial studies. Dietary restrictions of mothers in caloric, protein, mineral, and vitamin intake, as well as production of acute temporary vitamin deficiencies by means of vitamin analogues, will be used as experimental techniques. The young will be studied with respect to birth weight, anatomical malformations, vitamin content of tissues, viability, growth, and development. Similar observations will be made with animals fed the best diets that can be devised. Chemical studies will be make on the blood and tissues of mothers and young to study relation between maternal and fetal composition under various conditions. With young born to mothers on restricted diets, a study will be made on the effect of optimum vs. suboptimum nutrition on growth and performance. This may indicate whether deleterious effects of prenatal nutrition can be corrected later.

Biochem. 1514

Minn. Studies of Adrenal Glands of Ruminants. To (1) work out satisfactory technique for morphological and biochemical studies of adrenal medulla; and (2) apply techniques in correlated histological, histochemical, and biochemical studies of adrenal medullae of ruminants, from animals under conditions of rest and stress.

Vet. Med. 2628

Miss. A Study to Determine the Use of Exogenous Progesterone in the Control of the Reproductive Phenomena in Beef Cows. To (1) determine dosage of progesterone needed in beef cattle to best control ovaries in production of viable ova; (2) determine effect of various dosages on endometrium as shown by survival and development of viable ova; and (3) when a most optimum dosage is found, conduct a second experiment comparing results from this dosage when used on another group of cows, with results from a comparable group of non-treated control animals.

Anim. Husb. HE-7

Miss. The Role of the Pancreatic Hormones in Dairy Cattle. To study (1) effects of pancreatectomy on dairy goats and dairy cows; (2) effect of glucagon, insulin, and growth hormone on milk production and energy metabolism in dairy cattle using intact and pancreatectomized goats and cows; and (3) gross, histological, and histochemical changes in pancreas, pituitary, and liver due to hormone administration and pancreatectomy.

Dairy Husb., Vet. Sci. HG-12

N. C. Studies on the Effects of High Environmental Temperatures and Humidity on the Performance and Reprodutive Efficiency of Farm Animals. To learn (1) extent environmental temperature and humidity affect reproduction in dairy bulls, and establish range in these factors where optimum fertility can be maintained; (2) endocrine physiology of dairy bulls subjected to thermal stress and its involvement in underlying mechanisms affecting body temperature regulation; (3) effectiveness of shades, fans, and sprinklers on production, fertility, body temperature, skin temperature, and respiratory rate in swine and sheep during hottest weather; and (4) comparative heat tolerance of purebred and crossbred beef breeds.

Anim. Indus. 24 Coop. USDA, USDC-WB

Ohio The Relationship Between the Serum Protein-Bound Iodine and Plasma Cholesterol in the Bovine and Their Possible Application to Dairy Production. To (1) learn degree to which dietary sources of iodine may interfere with specificity of protein-bound iodine (PBI) test as measure of thyroid activity in blood; (2) continue study of application of PBI test to detection of cows fed thyroprotein, and selection of cows that are hypothyroid and would most likely respond favorably to thyroid stimulation; (3) after completion of 1, study relation between PBI and cholesterol in blood along with eosinophil counts to measure possible stress on adrenal cortex due to throprotein feeding; and (4) ascertain degree of breakdown of protamone and other thyroidal substances in rumen by microorganisms.

Dairy Sci. 13

Oreg. Relationship of Cardiovascular Activity to Environmental Stresses in Cattle and Sheep. To (1) learn nature of cardiac adjustments, under normal and stress conditions, and study cardiac activity as an index of stress; and (2) study mechanisms of alterations in cardiac activity in beef cattle and sheep.

Anim. Husb. 278 (W-46) Coop. ARS

Tenn. The Effects of Certain Atmospheric Effluents Upon the Growth and Composition of Plants, and Upon Animal Life, at Locales in East and Central Tennessee. To ascertain the verity of numerous contentions that the harmful effect upon growth and composition of crops and the severe effects upon livestock in certain locales are attributable to effluents released from nearby manufacturing operations; to establish the causal factors for any such determined effects; and to propose remedial measures and to demonstrate their efficacy.

Agron. 50 Coop. TVA

Utah Interrelations of Climate and Nutritional Stress on Growth and Production of Range Sheep and Cattle. To (1) evaluate and develop more efficient methods of estimating the physiological well-being of range sheep and cattle; and (2) learn effect of nutritive levels on their growth and reproduction when maintained under stresses of climate.
Anim. Husb. 488 (W-46)

Va. Volatile Fatty Acid Metabolism and Glycogen Storage as Related to Age and Dietary Changes. To learn (1) extent of differences of volatile fatty acid absorption by rumen as related to age, development, and associated dietary changes; and (2) if differences in ability of liver to handle volatile fatty acid as related to age.
Biol., Biochem. and Nutr. 86092

Reproduction and Lactation

Calif. The Relation of the Pituitary, Adrenal, and Gonads to Reproductive Status of Normal and Low-Fertility Animals. To (1) relate histological appearance of pituitary, adrenal, ovaries, and uterus to stages of estrous of cows of normal reproductive history; (2) compare histological differences of normal cows to cows with different types of lowered fertility; (3) relate histological conditions in organs and semen of bulls with different types of lowered fertility; and (4) relate histological conditions of pituitary and adrenal to their hormone content.
Anim. Husb. 1550 (W-49) Coop. USDA

Colo. Causes and Treatment of Testis Failure in Sub-Fertile Bulls. To (1) study basic factors involved in spontaneous testis failure; (2) establish criteria by which the types of testis failure can be classified; (3) develop methods of evaluation of hormonal pattern in body fluids and excreta of normal and abnormal breeding bulls; and (4) employ and test available hormone preparations for controlled therapy to correct failure.
Chem., Vet. Sci. 210 (W-49)

Fla. The Effect of Hormones on the Physiology of Reproduction in British and Brahman Beef Cattle. To compare response of British and Brahman cows at various reproductive states to estrogen, progesterone, and gonadotrophin hormones. Conduct studies on relative gonadotrophin activity of pituitary gland in 2-year old heifers in December and June to see if length of day and season influence pituitary activity. Frequently palpate ovaries to learn follicular development and ovulation. Following treatment, learn response of ovary by laparotomy or slaughter. Injection response to be shown by estrous behavior, size and number of corpora lutea. Subcutaneously inject high, intermediate, and low doses of estrogen and study effect by: interval from injection to estrus, length and intensity of estrus.
Anim. Husb. & Nutr. 809

Idaho The Effect of Progesterone Therapy on Breeding Efficiency in Cattle. To (1) learn effects of progesterone administration following breeding on conception, implantation, and maintenance of pregnancy; and (2) determine types and percentages of abnormalities of the reproductive system present in apparently normal cows by manual examination at time of estrus.
Dairy Husb., Vet. Sci. 281 (W-49)

Ill. Physiology of Mammalian Germ Cells as Related to Embryonal Mortality. To (1) learn effects of aging germ cells, in vivo and in vitro, on embryonal mortality and subsequent development; and (2) determine effect of various storage media and of temperature on viability of germ cells.
Anim. Sci. 20-383

Ill. Endocrine Factors in Dairy Cattle Performance. To (1) increase fundamental knowledge of hormone levels and genetic and environmental factors affecting these levels; and (2) study levels of gonadotrophic and sex hormones by tissue culture technique and study stimuli originating in reproductive organs controlling these levels.
Dairy Sci. 35-321

Iowa Reproduction in Farm Animals. To (1) study quantitatively the action of estrogen and progesterone on estrus in ovariectomized heifers and cows; (2) compare effects of estrogens as estrone, estradiol benzoate, and diethylstilbesterol on estrous response of ovariectomized cow; and (3) obtain quantitative data on relation of androgen to inositol content of male accessory organs of white rat.
Anim. Husb. 1325

Kans. A Study of Some Environmental and Physiological Factors Associated With Bovine Reproduction. To determine (1) effects of estrual cycle and variations and associated pathological changes on reproductive efficiency; and (2) effectiveness of killed vs. live vaccine in calfhood vaccination and relative immunity obtained in partially infected herd.
Dairy Husb. 391

Ky. The Effect of Delayed Fertilization on the Development of the Ovum of Repeat-Breeding Dairy Heifers. To learn if age of ovum at time of fertilization has an effect on embryonic death rate in repeat-breeding dairy heifers.
Dairy Indus. 89

La. Breeding Disorders. To (1) determine major causes of low conception rates in many herds of cattle, studying individual problem animals; (2) determine basic cause or causes for high anestrus rate found in Louisiana cows; and (3) investigate effectiveness of various treatments in alleviating conditions found.
Vet. Sci., Dairy Husb. 765

La. Effects of Air Movement and Air Movement Plus Sprinkling on Semen Production, Fertility and Physiological Responses of Dairy Bulls Under Southern Conditions. To develop practical management procedures for bulls which will result in production of good quality semen and high fertility during summer in the areas affected by high temperatures and high humidity.
Dairy 842

Mass. Physiology and Reproduction of Dairy Cattle. To (1) investigate possible existence of pattern alterations in amino acids, proteins or other constituents in blood or urine associated with estrous cycle or gestation; (2) identify physiological processes in maintenance of corpus luteum thru course of pregnancy subsequent to conception; and (3) investigate effect of pre- and post-ovulatory environment on embryo survival thru use of embryo transplantation.
Anim. Husb. 34

Mass. Causes and Prevention of Reproductive Failures in Dairy Cattle. To (1) obtain more complete picture of histological characteristics of bovine corpus luteum, cotyledon and placenta than is now available; (2) note more important changes occurring at various ages, at selected stages of estrous cycle, and during early pregnancy; (3) compare histological pattern for normal cattle with appearance of tissues from animals with histories of breeding trouble; (4) use better histochemical methods developed with lab animals to study these selected tissues in the cow; and (5) attempt by use of certain hormones to modify normal picture and evaluate differences.
Anim. Husb. 33 (NE-41)

Mich. A Study of the Effect of Hormones Upon Bacteria Found in the Reproductive Tract of Certain Farm Animals. To determine (1) physiological effect in vitro of gonadal hormones upon pathogens isolated from reproductive tract; and (2) same effects in vivo of these hormones upon selected infected animals.
Vet. Med. 109

Minn. Studies on Physiological Factors Affecting the Degree of Fertility and Methods of Increasing Breeding Efficiency in Livestock. To (1) learn cause of low fertility in sires and provice methods of increasing and maintaining fertility, uncover more basic information related to normal reproductive processes in the male, study use of supplementary endocrines in male and their effects on reproductive processes; and (2) complete studies on physiology of fetus in utero, in order to establish the normal fetal-maternal relation giving rise to live birth, establish procedures where experimentation can be applied on fetus without harm, learn factors affecting impairment of fetus' normal development and causing death, develop ways of reducing incidence of prenatal mortality under present circumstances.
Anim. Husb. 1424

Miss. Study to Determine the Use of Exogenous Progesterone in the Control of the Reproductive Phenomena in Beef Cows. To (1) learn dosage of progesterone needed in beef cattle to best control ovaries in production of viable ova; (2) learn effect of various dosages on endometrium as shown by survival and development of viable ova; and (3) conduct a second experiment, when a most optimum dosage is found, comparing results from this dosage when used on another group of cows, with results from a comparable group of non-treated control animals.
Anim. Husb. HE-7

Miss. Lowered Fertility in the Bovine. To (1) survey reproductive performance of cattle in state experiment station system to learn reproductive efficiency for each herd of system and factors contributing to reproductive efficiency; (2) learn nature of sterility in cows leaving herd because of low reproductive performance; and (3) propose and test treatments which may increase reproductive efficiency.
Anim. Husb., Vet. Sci. HE-19 RRF 3 (S-10)

Miss. The Relation of Exogenous Estrogen to Estrus, Ovulation and Ovarian Characteristics in Dairy Cattle. To study (1) effect of varying levels of exogenous estrogen administered at various times during estrus cycle on length of estrus, time of ovulation, subsequent luteal and follicular development and the gross, histological, and histochemical characteristics of the ovary; (2) gross, histological, and histochemical characteristics of the ovaries and corpora lutea of cows slaughtered at various known stages of estrus cycle; and (3) effect of a single dose of estrogen administered 24 hours after parturition, on recovery of ovary following gestation.
Dairy Husb. HG-7

Miss. The Control of Specific Types of Bacteria in the Reproductive Tract of Difficult Breeding Cows by the Use of Antibiotics. To develop suitable treatment for controlling bacteria which appear to be associated with lowered breeding efficiency in dairy cattle and determine effect of this treatment on concention rate of difficult breeding cows.
Dairy Husb. HG-8

Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving: ova and spermatozoa storage and preservation, artificial insemination, ova transfer, fertilization mechanism, and chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick embryos and other biological tissues which aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.
Anim. Husb. 81

Mo. Estrus, Ovulation, Nidation, Embryonic Deaths and Related Phenomena in the Female Spermatogenesis and Related Physiological Functions in the Male. To study the fundamental anatomy and physiology of the reproductive organs of farm animals with special emphasis, at present, on the litter bearing animal, swine.
Anim. Husb. 222

Mont. Urinary Estrogenic Excretion by the Bovine. To establish (1) a procedure for quantitatively separating estrogenic substances in cow urine; (2) normal urinary estrogenic excretion pattern during estrous and gestational cycles; (3) effect of conception upon urinary estrogenic excretion pattern; and (4) effect of reproductive abnormalities on urinary estrogenic excretion pattern.
Dairy Indus. 19, MS 920 (W-49)

Nev. Chorionic Gonadotrophin of the Cow. To (1) characterize gonadotrophic hormone of bovine chorion; (2) attempt to detect gonadotrophin in blood and/or excreta of pregnant cow; and (3) compare blood and urinary proteins in non-pregnant and pregnant cows.
Chem., Anim. Husb. 25

Nev. Physiological Studies of Repeat-Breeding Cows. To (1) explore physiological and pathological disturbances underlying conditions of repeat-breeding; and (2) develop satisfactory methods to prevent and treat this condition.
Anim. Husb. 94 (W-49) Coop. ARS

N. H. Causes of Reproductive Failure in Cattle Fed Ladino Clover Mixtures. To learn if a suspected adverse effect on reproduction in dairy cattle resulting from feeding Ladino clover-bromegrass forage is real and if it is related to level of fertilization of soil and minor element intake of animal.
Dairy Husb., Agr. and Biol. Chem. 76 (NE-1) Coop. ARS

N. J. Studies on Causes and Prevention of Reproductive Failures in Dairy Cattle. To learn effect of various postpartum treatments upon the reproductive efficiency of dairy cows.
Dairy Indus. 137 (NE-1)

N. Y. (Cornell) Factors Controlling Ovulation in the Cow. To find major factors involved in ovulation, and time at which it occurs in dairy cattle. Time of ovulation, and length of estrus period are determined in heifers in a control estrus period and in an estrus period in which a hormone or drug is administered at the start of estrus. Each animal serves as its own control. Time of ovulation is determined by rectal palpation at 2 hour intervals or by laparatomy.
Anim. Husb., Dairy Indus. 64-E (NE-1) Coop. ARS

Oreg. Increasing Fertility of Male Farm Animals Through Improvement of Semen Production, Evaluation and Preservation. To (1) investigate factors regulating testicular activity particularly as related to increased semen production; (2) improve methods of semen evaluation to differentiate good quality from that of low fertilizing capacity; and (3) develop better methods for semen preservation to maintain higher vitality of spermatozoa than is present in storage by conventional methods of freezing.
Anim. Husb. 155

Pa. The Reproductive Capacity of Dairy Bulls as Influenced by Nutrition. To learn the effect of certain dietary factors upon: (1) the development of sexual maturity in dairy bulls; (2) the reproductive performance of dairy bulls, with particular reference to the quantity and quality of the semen produced; and (3) the length of the useful reproductive life of dairy bulls.
Dairy Sci. 1064 (NE-1)

Pa. The Nature of Infertility in Dairy Heifers. To determine (1) rate of fertilization 3 days after breeding, rate of embryonic mortality between 3rd and 34th days of pregnancy, and microbial flora of reproductive organs and semen used for insemination using functionally normal, nulliparous heifers; and (2) frequency and proportional distribution of different types of genital abnormalities and histopathology of reproductive organs thyroid, adrenal and pituitary glands.
Bact., Vet. Sci., Dairy Sci. 1143 (NE-1)

Pa. Corpus Luteum Removal in Subfertile Dairy Cows. To evaluate effectiveness of removing corpus luteum from ovary of repeat breeding cows as means of improving fertility, as measured by: induction rate of estrus and ovulation, fertilization rate (3 days after insemination) of ova released following induced estrus, embryonic survival rate (30 days after insemination) of cows conceiving following induced estrus.
Dairy Sci., Vet. Sci. 1273 (NE-41)

Pa. Vibrionic Infertility in Cattle. Study physiology and serology of genital vibrious and epidemiology of vibriosis to: (1) establish a selective means of isolating *Vibrio fetus* from infected animals; (2) improve "*in vitro*" growth of *Vibrio fetus* to facilitate preparation of an antigen and to expedite laboratory "pure culture" studies; (3) provide accurate means of diagnosis at earliest time after infection; (4) establish role of other organisms found in genital tract as possible symbiants or secondary invaders in bovine infertility; and (5) learn mode of transmission, route of infection, and factors influencing establishment of infection and immunity.
Vet. Sci., Dairy Indus. 1274

S. Dak. A Study of the Recovery and Transplantation of the Bovine Ova. To (1) develop techniques for the *in vivo* isolation of the fertilized and unfertilized bovine ova; and (2) develop transplantation studies after development of the isolation technique.
Dairy Husb. 189

Tenn. The Effect of Radiation on Reproductive Physiology in Farm Animals. To evaluate effects of acute and chronic irradiation on reproductive physiology and growth in farm animals on (1) semen characteristics; (2) potential fertility in the male; (3) estrual cycle phenomena in the female; (4) potential fertility in female; (5) endocrine system; and (6) growth of young animals.
Anim. Husb. 66 Coop. ARS

Tex. A Study of the Maturation Process in the Ova of Mammals. To (1) determine normal maturation process of egg nucleus in cow, ewe, sow, mare, and mule; (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular and luteal phase of the cycle; and (3) obtain data for cause of infertility of mammalian eggs.
Anim. Husb. 854

Wash. Identify and Measure the Principal Steriod Hormones and Closely Related Compounds Produced by Catte. To (1) identify qualitatively steroid hormones and closely related compounds in cattle fluids and excreta; (2) develop or adapt quantitative methods for appraisal of steroid hormones and closely related compounds in cattle fluids and excreta; and (3) appraise, as suitable methods are developed, excretion rates for extremes in reproductive efficiency and compare with secondary chemical, physiological, and anatomical factors.
Chem., Dairy. Sci. 1335 (W-49)

W. Va. Breeding Efficiency of Dairy Cows. To study (1) failure of cows to conceive with single service; (2) value of hormones as aid to conception; and (3) value of physical therapy as aid to conception.
Anim. Husb., Dairy Husb. 33

W. Va. Causes of Sterility in Cattle. To study possibility of viruses as a cause of sterility using virus inoculation techniques, study of action of virus in embryonating chicken eggs, and transmission of virus isolations to virgin heifers.
Anim. Husb., Dairy Husb. 55 (NE-1)

W. Va. Reproductive Efficiency of Beef Cattle. To (1) learn practicability and effects of breeding beef cows at first heat after delivery; (2) learn incidence of ovulatory anomalies in cattle and their effects on reproduction; and (3) compare reproductive efficiencies of 2 breeds of beef cattle when managed to learn cause of sterility.
Anim. Husb. 90 (S-10)

Wis. Factors Involved in Fertilization Failure and Early Embryonic Mortality in Cows of Low Fertility. To (1) determine phases of reproductive process where most failure occurs; (2) develop methods of diagnosis of cause of herds under field conditions; (3) identify reproductive failures of a particular nature with most likely cause; and (4) develop, on the basis of findings, researches on breeding, nutrition, disease and management to correct existing low fertility.

Anim. Husb., Zool., Vet. Sci., Genet. 532a Coop. ARS

Wis. Forage Composition and Crop Management as Related to Reproductive Disorders in Cattle on Marsh Areas in Central Wisconsin. To (1) survey in detail plant populations in pastures where abortions have occurred and in those where occurrence is seldom, correlate plant species present with same or other species with known adverse effect; (2) feed experimental animals plants which might cause abortion in cattle; and (3) study management of unfavorable pastures to see if time of pasturing, stage of growth, season, or past treatment may be involved.

Agron., Vet. Sci. 957

Rumen Function and Bloat

Ark. The Influence of Quality of Roughage on Rumen Digestion. Learn influence of quality of roughage on rumen digestion; use information as a basis for formulating more efficient rations for dairy cattle.
Anim. Indus. & Vet. Sci. 331

Calif. Studies on Bloat in Ruminants. Study basic factors influencing formation and elimination of ruminal gas in cattle and sheep.
Anim. Husb. 1703 Coop. ARS

Ill. Studies on Protein and Carbohydrate Metabolism in Ruminants, Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315

Ind. Biochemical Aspects of Ruminant Bloat. To learn (1) constituents of feeds and forages that increase bloat, (2) biochemical compounds and reactions involved in bloat.
Agron., Biochem, Vet. Sci. 828 (NC-27)

Iowa Increasing the Usefulness of Forage Crops and High-Cellulose Roughages by Improved Rumen Function (ZYMO-Chemistry) in Beef Cattle and Sheep. To (1) increase usefulness of forage crops and high-cellulose roughages thru improved rumen function or improved bacterial digestion within rumen of beef cattle and sheep; and (2) work for better nutrition in cattle and sheep resulting from improved rumen function especially in those animals subsisting largely upon low-grade roughages and forages.
Anim. Husb., Chem., SBS 1208

Iowa Physical and Chemical Aspects of Bloat. To (1) study effect of dietary components and therapeutic agents on physical and chemical characteristics of rumen ingesta; (2) learn relation of dietary characteristics to incidence of bloat; (3) learn various physical and chemical characteristics of rumen ingesta and of blood and other tissues from bloated animals; (4) learn efficacy of prophylactic procedures and therapeutic agents; & (5) learn relation of physical characteristics of animal to incidence of bloat.
Anim. Husb. and Dairy Husb., Chem., Vet. Med. 1267 (NC-27)

Iowa

Cellulose Digestion by Pure Cultures of Rumen Microorganisms. Isolate and characterize (1) rumen microorganisms which are active cellulose digesters; (2) cellulose dextrins and oligosaccharides and products formed from them by enzymes or pure cultures of rumen microorganisms. Study (3) by means of artificial rumen technique, the availability of isolated cellulose breakdown products to mixed cultures of rumen microorganisms in predicting usefulness of these products in cattle and sheep rations; (4) potential utility of cellulolytic enzyme preparations as feed additives or as solubilizing agents for coarse roughages prior to feeding.

Anim. Husb., Chem. 1357 (NC-25)

Kans.

A Study of the Intermediary Metabolism of Rumen Microorganisms with Reference to the Formation of End Products from the Carbohydrates of Roughage. Elucidate mechanisms in formation of end products, as fatty acids, from the carbohydrates of roughage. Study inter-relationship of apparently nonuseful end product methane with production of useful carbonaceous end products. Isolate enzyme systems capable of carrying on one step reactions found in carbohydrate fermentation.

Bact., Dairy Husb. 425 (NC-25)

Kans.

Interrelationships of Feedstuffs Combinations, Appetite, Rumen Function, Digestibility, and Rumen Microorganism in Roughage Utilization. To learn (1) interrelationships of feedstuffs combinations, appetite, rumen function, digestibility, and rumen microorganisms so as to explain differences among animals in their ability to utilize roughage, (2) parts played by rumen microorganisms and combinations of feedstuffs in efficiency of roughage utilization.

Dairy Husb. 455

Mich.

The Use of Nitrogenous Materials in Ruminant Nutrition. To (1) determine optimum protein levels needed to obtain maximum use of roughages; (2) determine extent to which urea or other simple N sources can be used in place of natural protein; and (3) establish role of other nutrients such as trace minerals and organic growth promoting factors required to produce maximum digestion of cellulose and other rather indigestible components of feeds.

Anim. Husb. 118

Mich. Investigations of the Causes and Methods of Control of Frothy Bloat. To learn (1) chemical and physical properties of saliva, (2) relationship of saliva and its components to frothy bloat, (3) effect of rations on amount of froth produced, (4) role of microorganisms in production and stabilization of froth in rumen.
Dairy 812 (NC-27)

Minn. Bloat Producing Mechanisms in Ruminants. To (1) clarify poorly understood motor control mechanisms in the ruminant stomach, especially the forestomachs, (2) develop a bioassay procedure for toxic, bloat-producing legume extracts.
Anim. Husb., Dairy Husb., Vet. Med. 2624 (NC-27)

Miss. A Study of the Causes and Prevention of Bloat in Cattle. To (1) study relationship of incidence of bloat to fertilizer treatment, soil type and soil fertility; and (2) study various preventive treatments, such as minerals, drugs and management practices.
Anim. Husb. HE-4

Mo. Rumen Culture. To (1) set up in lab an artificial rumen with conditions simulating those found in natural rumen; (2) study by quantitative chemical analysis the changes that occur in a ration as it is fermented in artificial rumen; (3) study methods of preserving rumen organisms so they will be available for inoculation of artificial rumen; and (4) study effects of these preserved rumen microorganisms on a ruminant.
Agr. Chem. 152 Coop. USDA

Mo. Pasture Improvement.--d. The Incidence of Bloat and Methods for Its Control. To determine (1) under what conditions pastures produce a high incidence of bloat, and (2) if simple methods of management can be used to control it.
Anim. Husb. 154-d

Mo. Ruminant Digestion.--c. An Attempt to Establish Rumen Flora by Inoculation. To (1) inoculate animals, with a functioning rumen flora, at the time of major ration changes and evaluate the subsequent performance of the animals; and (2) determine effect of inoculating lambs in early life on subsequent performance.
Anim. Husb. 168-c

Mo. Nutritive Value of Foods.--a. Nutrients in Grains, in Forage Crops, and in Rations of Ruminants Before and After Fermentation in an Artificial Rumen by Rumen Microorganisms. To (1) compare nutritional value of newer forages; (2) obtain further data on effect of fertilizer treatments on nutritional properties of plant; (3) study amino acid content of practical rations which support rapid growth of chicks and find what amino acids are deficient in feedstuffs which permit only slow growth of poultry; (4) study improvement of bovine and bovine rations, in vitamin and amino acid content, during fermentation with rumen microorganisms in an artificial rumen;--i. to study synthesis of essential amino acids in low protein rations containing urea; and ii. to find whether nutritional properties of cottonseed oil meal can be improved by this procedure; and (5) determine percentage of zein protein in crude protein of 55 samples of exotic corn grains secured by Dr. Zuber from the Iowa State College Experiment Station.
Agr. Chem. 212

Nebr. Rumen Biochemistry and Nutrition: The Digestion and Degradation of Feed Protein in the Rumen. To learn (1) occurrence of protein splitting reactions, extent thereof, and importance and effect of various factors on protein digestion, (2) nature of reactions which degrade N compounds within rumen, extent of such breakdown particularly to ammonia, and effect of various factors on degradation.
Biochem. and Nutr. 514

Nev. Isolation and Determination of Bloat Producing Saponins in Nevada Forage. (1) Secure composite samples of saponins and sapogenins from Western Utilization Research Branch and separate or isolate saponins and sapogenins. (2) Develop a better strain for identification by chromatography or electrophoresis. (3) Quantitatively learn saponins or sapogenins present.
Agr. Chem. 37

N. Dak. Rumen Microbiology in Sheep and Cattle. (1) Identify species of microbes that populate rumen in sheep and cattle under various nutritional conditions. (2) Evaluate effect of various growth factors and antibiotics on efficiency of utilization of high and low quality roughages in an artificial rumen.
Anim. Husb., Bact. 8-4 (NC-25)

Ohio

Digestion Studies.--7. Factors Affecting the Utilization of Feeds by Ruminants. To (1) learn factors affecting roughage digestion in ruminants, using an artificial rumen technique; (2) learn by in vitro methods factors in non-protein N utilization by rumen microorganisms; and (3) apply and further learn factors important in rumen function, using cattle experiments directed toward greater efficiency of utilization of low grade roughages.

Anim. Sci. 33

Ohio

Bloat in Ruminants. 1. Causes. To investigate causes of bloat based on clinical observations, examination of rumen samples for hydroscopic properties, volatile fatty acid content and microorganism variations and examination of blood concentrations of nitrogenous constituents.

Dairy Sci., Vet. Sci. 123 (NC-27)

Pa.

A Study of the Effect of Ration Components on the Metabolism of Rumen Microorganisms. (1) Compare crude fiber digestibilities in vitro with crude fiber digestibilities determined by conventional digestion trials. (2) Study depressing effect of high levels of soluble carbohydrate on the rate of cellulose digestion by rumen microorganisms in vitro. (3) Identify unknown growth factors for rumen microorganisms that increase rate of cellulose digestion and protein synthesis in vitro. (4) Study mode of action of newly discovered growth factors for rumen microorganisms.

Anim. Nutr. 1304

S. Dak.

Bloat in Ruminants. To (1) learn through physiological investigations cause and mechanism of death in bloat; (2) learn biochemical differences in bloat-producing and non-bloat-producing feeds and in rumen contents of bloated and normal animals; (3) ascertain bloat-producing potential of tetraploid and diploid forms in both yellow and blue flowered species of alfalfa.

Dairy Husb. 245-R (NC-27)

Va.

The Isolation, Propagation, and Nutrition Requirements of Cellulose-Decomposing Bacteria Found in the Rumen of Cattle that are Consuming High-Roughage Feeds. To (1) isolate cellulose-decomposing bacteria from rumen of cattle and design methods for propagation in quantity; and (2) investigate nutritional requirements of cellulose-decomposing bacteria as to carbon, N, minerals, and unidentified growth factors.

Anim. Husb., Anim. Path., Biochem. and Nutr. 86045

Va. The Effect of Various Protein and Non-Protein Nitrogen Sources on Protein Assimilation by Rumen Microorganisms. To (1) learn if non-protein N of types used in cattle feeds suppresses decomposition of feed protein by rumen microorganisms; and (2) compare proteins of forage crop stems and leaves, seed proteins, and animal proteins of high biological values of N sources in protein synthesis by rumen microorganisms.
Anim. Husb., Biochem. and Nutr., Biol., Dairy Sci. 86046

Va. The Metabolism of the Major Products of Rumen Fermentation and Gastro-Intestinal Digestion by Tissues from Ruminant Animals. (1) Study relative use of low molecular weight fatty acids and factors affecting their use by ruminant tissue preparations. Learn (2) principal route by which propionate is metabolized by ruminant and nonruminant tissue preparations; (3) effect of age and species differences on ability of tissues to metabolize low molecular weight fatty acids.
Anim. Path., Biochem. and Nutr., Dairy Sci. 86098

(For more information on research in this category see Parts No. 4b and 5.)

NUTRITION

General Nutrition

Fla. The Nutritional Availability of Components of Livestock Feedstuffs. Obtain quantitative evaluation of digestibility, absorption and metabolic utilization of livestock feedstuffs which are readily available but not generally used.
Anim. Husb. and Nutr. 755

Fla. The Nutritive Value and Storage Characteristics of Cobalt-60 Irradiated Foods and Feeds. Develop techniques for maintaining the nutritive value and palatability and extending storage period of foods and feeds preserved by irradiation with Co-60 at pasturization and sterilization levels.
Anim. Husb. and Nutr., Food Technol. and Nutr. 849

Hawaii Studies to Determine the Nutritive Value and Metabolism of Products and By-Products of Hawaiian Industry. Seek information relative to value of products and by-products of Hawaiian agriculture and industry for livestock feeding with major emphasis on use of molasses, sugar cane bagassee and pineapple by-products by: chemical analysis of feeds to be used; learn digestibility; feeding trials to assess production response accompanied by: studies of nutrient absorption, nutrient and metabolite levels in blood and urine, metabolism and its relation to requirements for specific nutrients.
Anim. Sci. 269

Ill. Nutritional Aspects of Aging in Animals. (1) Evaluate impact of aging in animals on requirements for, and metabolism of, certain nutrients. (2) Learn effect of age in rat upon following processes: intestinal absorption of thiamine-C^{14}, cyanoco-balamin-Co^{60}, Ca^{45}; synthesis of the coenzyme forms of thiamine; occurrence of "bound" and "Diffusible" Ca in muscle and liver; uptake of Ca by the bones; digestibility of protein N.
Anim. Sci. 20-357

Ill. Carbohydrate Metabolism of Ruminants. Employ red cells of ruminants as a model system in a study of the metabolism of their tissues.
Dairy Sci. 35-323 (NC-25)

Mich. The Effect of Soil Fertility on the Composition and Nutritive Value of Crops and on the Health, Milk Production, Reproduction, and Nutritive Value of the Milk of Animals Eating the Crops. To determine (1) if a high state of soil fertility results in an improved nutritive value as well as increased yield; (2) comparative effect of crops grown on depleted and improved soil on health, reproduction, and milk production of offsprings for several generations; (3) effect of additions of lime, complete fertilizer and "minor" elements to a depleted soil on yield, composition, and vitamin content; and (4) effect of additions of lime, fertilizer and "minor" elements on chemical characteristics of a badly depleted soil.
Soil Sci. 76

Minn. Chemical and Biological Studies on Animal Nutrition.
Agr. Biochem. 1506 Coop. ARS, AEC

Minn. The Relation of Nutrients to Metabolic Processes. A wide variety of techniques and procedures will be used in this project to study with laboratory animals and with tissues derived from them and from larger animals the chemical reactions involved in metabolic processes and the enzymes associated with them. Of the many ramifications of the problem, attention will initially be focused on: (a) the metabolic function of vitamin E, studying (1) the possible importance in enzymic oxidation-reduction processes of a primary oxidation product of vitamin E which has already been recently discovered and isolated in this laboratory, and (2) the relation of vitamin E to oxidative phosphorylation processes in the organism; (b) the role of potassium in metabolic phosphorylations associated with the utilization of glucose; (c) the possibility that thyroxine may form a reversible oxidation product; and (d) the nitrogen metabolism in the early postnatal period.
Agr. Biochem. 1508

Mo. The Effect of Ration Physical Form on Ruminant Digestion and Feed Utilization. To learn effect of ration physical form on its digestion and metabolism by ruminants.
Anim. Husb. 250 (NC-25)

Nebr. Naturally Occurring Enzyme Inhibitors and Their Nutritional Significance. To study (1) occurrence of enzyme inhibitors in natural feedstuffs; (2) mode of action of such inhibitors; (3) their nutritional significance; and (4) means for counteracting effects of these inhibitors.
Biochem. and Nutr. 308

N. Y.
(Cornell)

The Nutritional Requirements of Herbivora as Studied by Purified Diet Methods. To determine the nature of the deficiency in purified diets and devise a diet of purified ingredients that will sustain satisfactory growth, reproduction, and lactation in herbivorous animals.
Anim. Husb. 59

Pa.

Influence of Soils and Fertilizers on the Composition and Nutritive Values of Foods and Feeds. To study influence of nutritive conditions of plant growth on composition and nutritive values of agricultural products.
Agron., Anim. Nutr., Dairy Sci., Hort. 1019

Texas

Methods for Measuring Potential Rate of Gain and Efficiency of Feed Utilization in Immature Beef Cattle. To develop methods of (1) biochemical or physiological nature which will measure in the immature animal, the potential rate of gain, and (2) measurement of the potential efficiency of use of feed for building body tissue.
Anim. Husb., Biochem. and Nutr. 714 (S-10) Coop. ARS

Wyo.

Nutritional Evaluation of Wyoming Feeds. To (1) learn coefficients of digestibility of proximate principles of Wyoming feeds, (2) learn N, Ca, and P balance when various Wyoming feeds are fed to ruminants, (3) compare "grab" sampling techniques utilizing indicators to conventional total collection techniques for determining digestibility, (4) learn digestion coefficients of proximate principles by bulls, heifers, rams and ewes on performance testing using "grab" sampling technics, (5) correlate feed-lot performance with digestion coefficients of proximate principles.
Anim. Prod. 566

(For more information on research in this category see Parts No. 4b and 5.)

Pasture and Forage

Ala. Investigations of the Changes in Chemical and Physical Properties of Pasture Herbage that Influence Their Utilization and Nutritive Value of Grazing Animals. To (1) determine with grazing animals seasonal distribution of digestible nutrients furnished by various forages adapted to several soil types and climate of Alabama; (2) study seasonal changes in physical and chemical properties of pasture plants and relation of these to palatability and nutritive value; (3) devise grazing management practices to promote continued optimum animal production from established swards.

Anim. Husb. and Nutr. 423

Ariz. The Evaluation and Utilization of Low Quality Roughages as Feeds for Livestock in Arizona. To evaluate by chemical analyses, digestibility trials, and palatability studies, roughages and by-product feeds present in Arizona and which possess nutrient deficiencies and palatability limitations. Learn effective and economical methods for efficient utilization of these low quality roughages.

Anim. Sci. 388 Coop. ARS

Ark. Methods of Improving the Digestion and Utilization by Beef Cattle of Roughages Produced in the South. To (1) improve digestion and use of roughages by beef cattle through proper supplementation; and (2) obtain further information on relation of digestion and use of southern grown roughages to changes in physical and chemical composition of plants as effected by methods of management and handling.

Anim. Indus. and Vet. Sci. 371

Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep through use of ad libitum and paired feedings, N balance, and digestibility; (2) make chemical studies on methods of analysis and isolation of fibers; and (3) apply findings to the utilization of forage.

Anim. Husb. 1569

Calif. Nutritive Value of Specific Range Forage Species as Influenced by Seasons, Fertilization and Management. To learn (1) techniques for measuring consumption, a. esophogostomy, b. clipping, c. hand selection, d. reference substances-lignin, chromic oxide, chromogens, (2) nutritive value of specific range species, a. chemical composition, b. digestibility, c. mineral availability, d. fiber utilization.
Anim. Indus. and Agron. 1670 (W-34) Coop. FS

Colo. An Investigation of Unidentified Nutritional Factors in Alfalfa and Certain Range Plants. To (1) study and identify unidentified nutritional factors in alfalfa and various browse types indigenous to Colorado range-land, which are known to enhance the over-all value of rations to which they are added; (2) determine manner in which such substances, as stated above act to supplement or improve rations in which they are included; and (3) determine optimum levels of supplementation of above mentioned factors.
Anim. Indus. 176

Colo. The Value of Native and Seeded Range Grasses and Supplementation Required in the Nutrition of Beef Cattle. To learn (1) nutritive value of native and seeded range grasses grazed in rotational pattern, (2) chemical analysis of seasonal changes in nutrient content of native and seeded range plants, (3) losses from range cover to rodents, insects, weathering, and cattle trampling, (4) effect on beef production of protein supplementation regulated to balance seasonal nutrient variation in range grasses.
Anim. Indus. 229 (W-34)

Del. Nutritive Evaluation of Forages. To determine (1) yield of digestible nutrients of forage crops cut at various stages of maturity and produced under different management procedures, (2) yield of digestible nutrients when various forages are grazed or when various systems of grazing are used, (3) if the rabbit can be used to test the digestibility of forages which are produced to be consumed by other species.
Anim. and Poultry Indus. 42-AI (NE-24)

Ga. Forage Consumption and Methods of Wintering Beef Cows on Pasture. To learn the value of (1) hay in addition to grazing while on winter pastures, and (2) cost of wintering cattle on winter pasture vs. dry lot feeding.
Anim. Indus. 50

Ga. The Fattening of Beef Calves on Winter Pasture. To learn (1) value of different winter clovers & grasses for fattening beef calves, (2) effect of addition of grain to steers while fattening in winter pasture, and (3) effects of above feeds on rate of gain, economy of gain, finish, market price, meat quality, refractive index and health of animals at 14-16 months.
Anim. Indus. 51

Ga. Maximum Use of Summer Grown Roughage in a Steer Fattening Program. Study use of maximum amounts of spring and summer grown roughages, hay or silage, fed with different kinds and levels of grain supplementation in a steer fattening program.
Anim. Indus. 208 Coop. USDA

Ga. Use of Annual Winter Pasture for Fattening Steers in the Coastal Plain of Georgia. Study value of annual winter pastures in steer fattening program when grazed alone and when supplemented with limited amounts of various carbohydrates and roughages.
Anim. Indus. 210 Coop. USDA

Hawaii Range Beef Cattle Nutrition Studies in High Rainfall Areas. (1) Obtain information on nutritive value of forages produced in humid rangeland areas on which better beef production and range management practices may be based. (2) Learn factors governing grazing value of humid rangeland on: native forages, native + introduced forage species, improved forage species. Learn: (3) need for supplemental feeding of range cattle under above conditions; (4) effect of range fertilization and land preparation on nutritive value of selected forages.
Agron. and Soil Sci., Anim. Sci. 261 (W-34)

Idaho Beef Cattle Nutrition on Seeded and Native Forage in Idaho. To learn nutrient content, total digestible nutrients, and digestible energy of forage consumed by cattle when grazing at different intensities and seasons of use on: seeded areas and native forage, (2) learn effect of intensity of grazing on nutrient intake and livestock production, (3) learn need for and value of various nutritional supplements for cattle subjected to above grazing treatments, (4) apply nutritional results obtained to better beef cattle production and range management practices.
Anim. Husb. 296 (W-34) Coop. FS, USDI - Bureau of Land Management

Ill. Beef Cattle for Increasing Income from Non-Corn Acreage in Corn Belt Crop Rotations. To study all possibilities for using beef cattle, especially calves and yearlings, to use the oat crop and the legume-grass seeding in the common corn belt crop rotation in a way that will increase net return from the acres devoted to growing soilbuilding crops and accompanying nurse crops; more specifically, to (1) study value of oats, harvested as silage, for wintering beef calves or for fattening yearling steers; (2) determine appropriate supplements to be fed with oat silage in the two programs mentioned under (1); (3) plan a calf and steer management program which will make best use of the oat and legume-grass seeding in the rotation; (4) study feasibility of extending the legume-grass seeding by using fresh-cut forage method of feeding instead of feeding on pasture; and (5) determine whether a program of finished steers on pasture or on fresh-cut forage adversely affects the carcass value as determined by carcass studies.
Anim. Sci. 20-349

Ill. Utilization of Roughages by Dairy Cattle. To provide fundamental data on optimum nutritive conditions for use of forages by dairy cattle and on value of various roughages in feeding dairy cattle.
Dairy Sci. 35-314 (NC-25)

Ill. Comparative Value of Pelleted Versus Loose Forage Crops for Beef Cattle Feeding. Compare alfalfa fed as long hay, chopped hay, pellets, and silage as to gains, feed consumption, palatability, and economy in wintering steer calves.
Anim. Husb. 40-329

Ill. Silage Made from Component Parts and the Whole of Various Plants. Study (1) contribution which component parts and combinations of parts of various plants can make to rations of beef cattle and sheep; (2) problems of preservation associated with making various parts into silage; (3) types of storage suitable for different silages. (4) Correlate various silages with various beef cattle and sheep feeding programs.
Dixon Spr. 40-338

Ind. Balancing Roughages for Growing and Fattening Cattle. To (1) test effect of certain modifications of Purdue Cattle Supplement A on use of roughage by cattle; (2) compare nutritive value of various roughages for growing and fattening cattle; and (3) determine other factors essential for roughage use and study nutritive value of such roughage as corn stover, wheat straw, oat hulls, peanut hulls, etc.
Anim. Husb. 692

Ind. Influence of Winter Gains and Level of Grain Feeding on Pasture upon the Output of Beef Per Acre. To learn (1) quantitative relationship between level of winter feeding of yearling steers and their subsequent output of beef per acre from unsupplemented pasture, (2) influence of supplemental grain feeding on pasture upon output of beef per acre, (3) interaction of level of winter feeding and level of grain feeding on pasture, (4) most economical combination(s) of level of winter feeding and grain feeding on pasture.
Agron. 827 Coop. ARS

Ind. Effect of Maturity and Harvesting Procedure on the Chemical Components and Digestibility of Alfalfa and Orchard Grass. To learn effect of: (1) maturity on content of lignin, cellulose, hemicellulose and soluble sugars in alfalfa and orchard grass; (2) cutting, drying, and ensiling of alfalfa and orchard grass on content of lignin, cellulose, hemicellulose and soluble sugars; (3) cutting, drying, and ensiling of alfalfa and orchard grass on solubility of hemicelluloses; (4) cutting, drying, and ensiling of feeding value of alfalfa and orchard grass.
Agron., Anim. Husb., Biochem., Dairy Husb. 915 (NC-25)

Kans. Nutritive Value of Forages as Affected by Soil and Climatic Differences. To study (1) differences in nutritive value of forages as affected by variations in fertility and other characteristics of soils, and (2) effects of climatic factors.
Anim. Husb. 430

Ky. Factors Affecting the Utilization of Low-Quality Roughage by Stocker Steers. Learn effects of adding following materials to rations composed principally of low-quality roughage and used for purpose of wintering stocker feeders that are to be grazed without grain following season: (1) corn distillers dried grains with solubles; (2) alfalfa meal; (3) trace minerals; (4) urea; (5) molasses.
Anim. Husb. 261

Ky. Utilization of Low-Quality Roughages by Dairy Heifers. To study the value of low quality roughages for dairy heifers and of factors affecting their utilization.
Dairy 406

Ky. Comparison and Evaluation of Several Techniques for Measuring the Nutritive Value and Palatability of Pasture Forage for Ruminants. To compare, evaluate, and further perfect the following indicators for learning digestibility and consumption of pasture forage by ruminants; lignin, chromium oxide, fecal nitrogen and forage nitrogen.
Anim. Husb. 1004 (S-12)

La. Comparison of Roughages for Winter Feeding and Maintenance of Beef Cattle. (1) Continue study and comparison of feeding value of roughages available in La. for wintering beef cattle; (2) learn relative value of concentrate mixture when fed with available roughages commonly found in La.
Anim. Indus. 782

Maine Nutritive Evaluation of Timothy Hay Grown with Various Levels of Nitrogen Fertilization. Learn (1) digestible energy and digestible protein content of 1st cutting timothy hay grown under various levels of N fertilization and harvested at full-head stage; (2) total protein, ether extract, ash and fiber content of these same hays; (3) lignin and cellulose content of these hays and study relation between these values and digestible energy values; (4) apparent digestibility of crude fiber fraction of hays.
Agron., Anim. Indus., Chem. 114 (NE-24)

Md. Nutritive Evaluation of Forages. To (1) determine nutritive value of forages fed to dairy cattle as affected by stage of maturity at harvesting, fertilizing and management practices, (2) evaluate different methods of harvesting and preserving forages, (3) determine total yield of nutrient material per unit of land from forages subjected to the above management procedures, and (4) aid in development of improved chemical techniques for evaluation of forages.
Agron. G-47 (NE-24)

Mass. Quality in Roughage: I. A Study of the Factors Which Influence Composition, Palatability, and Value for Milk Production of Roughages (Hay and Silage) Grown in Northeastern U. S. II. The Nutritive Evaluation of Forage by Means of Production Trials and Laboratory Tests. (1) Learn value for milk production of forages grown in region, with emphasis on crops of relatively recent introduction in comparison with those indigenous. (2) Learn effect on nutritive value on forage crops (of recently introduced crops & indigenous species) of increased use of fertilizers and improved methods of harvesting & storing. (3) Correlate results of milk production trials of crops with chemical analyses & other indicators of forage quality in search for simple test, as criterion, for quickly judging nutritive value of forage.
Dairy and Anim. Sci. 37 (NE-24) Coop. USDA

Mich. The Chemical Determination of the Carbohydrate Fraction in Various Forage Crops and Their Isolation and Identification. (1) Investigate suitability of existing chemical methods for learning various carbohydrates in forage crops and devise new methods whenever necessary, (2) Make systematic chemical study of carbohydrates in forage crops consumed by ruminants. (3) Investigate environmental conditions influencing composition of forages. (4) Make digestion trials on forages when feasible.
Agr. Chem., Dairy, Pl. Phys. 811 (NC-25)

Minn. The Utilization of Forages by Beef Cattle. Study (1) artificial rumen techniques as a method of quality evaluation of silages and other forages; (2) digestibility and feeding value of silages and other forages with beef cattle. (3) Learn value of various additions as energy, protein, hormones and antibiotics to rations of silage and other forage crops; measure values by metabolism studies.
Anim. Husb. 1423

Minn. Investigations of the Carbohydrates of Forage Crops with Special Emphasis on the Hemicelluloses. To investigate chemical nature and structure of carbohydrates of forage with emphasis as above. To accomplish by: (1) isolating hemicelluloses from bromegrass and from alfalfa, (2) degrading hemicelluloses or derivatives prepared therefrom into components as pentoses and uronic acids and their derivatives; separate and identify latter by chemical and physical properties; determine quantitatively relative proportions of various components of hemicellulose molecules. (3) deduction from objective 2 manner in which components are linked together, thus providing basis for studies of susceptibility of various linkages to cleavage by enzymes of rumen microorganisms. (4) providing specimens of isolated hemicelluloses to investigators in Regional Cooperative Project who may wish to study digestion and fermentation in "artificial rumen." (5) Investigating other carbohydrate components as fructosans and oligosaccharides that may be isolated incidental to procedures used for isolation of hemicelluloses.
Biochem., Anim. Husb., Dairy Husb. 1518 (NC-25)

Miss. A Study of Rations for Wintering Mature Beef Cows. To determine relative value of several rations for wintering bred beef cows in Mississippi.
Anim. Husb. HE-1

Miss. A Study to Determine the Relative Value of Different Winter-Grazing Crops for Finishing Weanling Calves. To determine relative value of various crops for production of winter grazing as measured by 1. rate of gain and total beef produced per acre; 2. cost of beef production; and 3. length of grazing period and tendency to winter kill.
Anim. Husb. HE-8

Miss. A Study to Determine the Value of Supplements for Improving the Utilization of Low-Quality Roughages. Learn kind of supplementation needed for maximum utilization of low-quality roughages by wintering beef cattle.
Anim. Husb. HE-10

Miss. Methods of Finishing Yearling and Two Year Old Steers for Market. To determine the relative value of (1) various methods of finishing steers as yearling and two year old on pasture with and without an additional feeding period of oats and wheat, and (2) sod-seeded pastures as compared to pastures planted on regularly prepared seedbed for winter grazing.
Anim. Husb. HS-1

Mo. Pasture Improvement.--A. Pasture of Cattle. To fatten steers during grazing season, checking health, weight gains, and management practices, for marketing purposes.
Anim. Husb. 154-a Coop. ARS

Mo. Pasture Improvement.--C. Periods of Maximum Response to Different Pastures by Steers. To determine periods of greatest gain for cattle on various pastures.
Anim. Husb. 154-c

Mo. The Effect of Nitrate in Feedstuffs on the Performance of Sheep and Cattle. To (1) observe effect of feeding forages, grown under conditions which favor high nitrate accumulation, on the rumen function and general performance of sheep and cattle, and (2) learn if effects observed in (1) can be duplicated by adding nitrate to the normal ration of cattle and sheep.
Anim. Husb. 251

Mont. Supplemental Feeding of Livestock on Native Range. Learn botanical and chemical composition of range forage and use of various species. Feed beef cattle supplements containing nutrients deficient in range forage and note effect of supplementation on growth, weight gains, reproduction, and blood composition of beef steers fed supplements during fall and winter grazing. Learn about creep-feeding of range calves.
Anim. Indus. and Range Mgt. MS 956, AI 108, (W-34)

Mont. Utilization of Montana-Grown Feeds for Fattening Cattle on Dry Land Farms and Irrigated Pastures. Develop and test rations for fattening cattle in (1) dry lot which uses alfalfa hay, wheat straw, Montana-grown feed and feed by-products in various combinations and with or without added supplements; (2) irrigated pastures using Montana-grown feed and feed by-products in various combinations, with and without supplements.
Anim. Indus. and Range Mgt. 1005

Nebr. Nutritional Factors Affecting Roughage Utilization by Cattle. To (1) determine effect of various protein levels alone and as influenced by addition of carbohydrates and minerals; (2) determine value of adding cane molasses to roughage rations when different levels of protein are fed; (3) determine value of adding trace minerals to roughage rations with different levels of protein; and (4) observe combined effects of molasses and trace minerals when added to roughage rations when different levels of protein are fed.
Anim. Husb. 445

Nebr. Value of Specific Roughages in Rations Containing Equivalent Levels of Known Essential Nutrients for Fattening Cattle. To (1) determine comparative values of alfalfa hay, bromegrass hay, and prairie hay as roughages in rations for fattening beef cattle; and (2) compare the value of urea, soybean oil meal, and alfalfa hay as nitrogenous supplements in fattening rations.
Anim. Husb. 456

Nebr. The Mechanism of Digestion of Polysaccharides from Roughages by Microorganisms of the Rumen. Identification of products of digestion of polysaccharides from roughages by bacteria from rumen. Investigation of mechanism of utilization of degradation products of polysaccharides.
Dairy Indus. 491 (NC-25)

Nebr. The Influence of Different Levels Stocking on Summer Livestock Gains and the Consequent Changes in Botanical Composition, Range Condition and Quality of Forage on Western Nebraska Rangeland. Learn: (1) effect of three levels of stocking on summer gains of livestock on rangeland; (2) influence of varying degrees of use on condition and botanical composition; (3) seasonal trends in nutritive content of major forage producing species.
Agron., Anim. Husb. 594

Nev. The Nutritive Value of Range Forage and Its Relationship to Reproduction and Growth of Range Livestock as Modified by Nutrient Supplementation. Learn botanical and chemical composition of diet of range livestock as modified by location, season, climate, and management practices with special reference to nutrient deficiencies. Learn effects of seasonal supplementation upon growth, reproduction, blood and body composition during both period of supplementations and subsequent periods in terms of nutrient requirements under range conditions. Study use of range forages as determined by growth, digestibility, metabolism, and body composition studies. Develop techniques for study.
Anim. Indus. 8 (W-34) Coop. ARS

Nev. The Development of Supplements for Wintering Range Cattle Fed Native Meadow Hay. (1) Learn which nutrients fed alone and in combinations will best supplement native hay. (2) Learn effect of various kinds of supplements on subsequent use of range forage as measured by forage consumption, rate of gain, blood constituents, digestibility and body composition of grazing beef cattle. (3) Compare sources of nutrients in winter supplements that will most economically meet requirements.
Anim. Husb. 27

Nev. Possible Conservation of Range Forage as Based Upon Daily Weight Gains of Cattle on Summer Range. To determine if cattle intended for market make monthly gains from the time they are turned on the range in the spring until they are gathered in the fall; usually in late September and early October.
Agron. and Range Mgt. 69

Nev. Beef Production on Irrigated Farms. To learn feasibility of producing beef on irrigated lands not in range or native vegetation.
Agron. and Range Mgt., Anim. Husb. 83

N. H. The Nutritive Evaluation of Forage for Dairy Cattle. (1) Improve and standardize procedures for nutritive evaluation of forages for dairy cattle. (2) Compare values for energy as net, digestible, metabolizable and compare digestible dry matter and total digestible nutrients determined on same forage. (3) Learn effect of stage of maturity and level of N fertilization on nutritive value of certain forages. (4) Learn effect of variables on nutritive value of acre yield. (5) Learn effect of variables on excretion of certain B complex vitamins.
Agr. and Biol. Chem., Dairy Husb. 102 (NE-24)

N. J. Relationship of Time of Cutting to Digestibility of Hay from Alfalfa and Birdsfoot Trefoil. To determine the digestibility of (1) alfalfa hay cut during the 1/10, 1/2 and full bloom stages; and (2) Birdsfoot Trefoil hay during the 1/10, 1/2 and full bloom stages.
Anim. Husb., Farm Crops 90 (NE-24)

N. Mex. The Effect of Various Purified Food Ingredients in Ruminants. Learn the influence of various food supplements on digestibility of a native range hay with sheep.
Anim. Husb. 3

N. Mex. Effect of Season and Location on the Chemical Composition of Range Forage. (1) Periodically sample chemical composition and seasonal variation for important range forage plants in 10 representative areas of State. (2) Learn loss or variation of different nutrients that may be caused by wintering, leaching, or other factors. (3) Measure available P of soil and its relation to plant P. (4) Learn trace mineral content of most important range grasses in New Mexico.
Anim. Husb. 52 (W-34)

N. Mex. Wintering Stocker Calves. To (1) compare rations containing moderate and liberal amounts of T. D. N. for stocker calves in regard to: rate of gain made by calves; cost of feed for wintering; cost of additional gain produced by heavier ration; and effect on gains made on range the following summer; and (2) determine effect of weight of stocker calves on: rate of gain; amount of feed needed for wintering; and returns for feed used.
Anim. Husb. 53

New York (Cornell) The Development and Use of Indirect Methods for the Measurement of Digestibility and Rate of Consumption of Feedstuffs, Particularly Pasture Forages, by Ruminants. To (1) test adequacy of indicator methods (chromogen and Cr_2O_3) previously developed with steers for measurement of digestibility and intake of grazing cows, and/or modify these to effect reliable measures with cows; (2) compare effectiveness of feeding Cr_2O_3 in concentrate feeds with administering it in capsules; (3) study reliability of intake estimates as influenced by 1 and 2 dosages per day, and (4) attempt to work out a rapid method for determination of chromic oxide.
Anim. Husb. 65 (NE-24)

N. Y.
(Cornell)

The Relationship of Time of Cutting to the Digestibility of Different Forages. Learn (1) digestibility of energy and dry matter of first cuttings of orchard grass, brome grass, timothy, and alfalfa. Empire birdsfoot trefoil, red clover, Viking birdsfoot trefoil, and ladino clover cut: May 20, June 7, July 25 and 7, (2) digestibility of aftermath growth when cut at various intervals, (3) influence of irrigation on digestibility offorage, (4) effect of N fertilizer on digestibility of grasses, (5) relationship of leaf and moisture content to digestibility.
Agron., Anim. Husb. 66 (NE-24)

N. Y.
(Cornell)

A Comparison of Different Intensities of Grazing with Green Crop Feeding of an Improved Pasture Mixture. Compare different intensities of grazing with green crop feeding of an improved pasture mixture by collecting data on milk production per cow, milk production per acre, seasonal carrying capacity, herbage consumption per cow, chemical composition of herbage and its relationship to consumption and digestibility, botanical composition, cost of production.
Agron., Anim. Husb. 68 (NE-24)

N. Y.
(Cornell)

Maximum Utilization of Forages by Livestock. To study (1) effects of methods of harvesting and storing on nutrient losses and chemical composition of forages; (2) effects of time of cutting on chemical composition and digestibility of forages for various classes of livestock; (3) by comparing the quality and feeding value of forages cut at different stages of growth and handled by different methods for feeding various classes of livestock, especially dairy and beef animals; (4) value of pastures with and without supplemental feed at various times during grazing season; (5) effects of high quality forage in reducing need for concentrates.
Agron., Agr. Engin., Anim. Husb. 195 (NE-24)

N. C.

Ladino Clover-Grass Pastures for Fattening Cattle. To study (1) methods of using Ladino clover-grass pastures to fatten cattle for market; (2) response of steers grazing Ladino clover-grass pastures to graded levels of grain; (3) forage consumption and digestibility by steers on graded levels of grain; (4) effects of various winter treatments on subsequent performance of grazing steers receiving graded levels of grain; and (5) contribution of clover and of grass in Ladino clover-grass pastures.
Anim. Indus. H-20

N. C. Biochemical Factors That Affect the Apparent Nutritional Qualities of Forages. (1) Identify and biologically characterize organic compounds in forages having a physiological action. (2) Identify factors in forages causing differences in animal responses associated with digestibility of feed consumed.
Anim. Indus. H-35

N. C. Factors Affecting Cellulose Digestion by Ruminants. Study in vivo and in vitro factors affecting: (1) potential cellulolytic activity in rumen; (2) ratios and rate of formation of end-products of cellulose degradation.
Anim. Indus. H-153

N. Dak. Roughage Utilization by Ruminants. (1) Study the "time factor" in roughage utilization by cattle and sheep. (2) Compare the abilities of cattle and sheep to utilize good and poor roughages. (3) Investigate effect of different feed supplements, as dried rumen preparations, antibiotics, hormones and other factors on roughage digestibility and utilization by the ruminants.
Anim. Husb. and Vet. Sci. 7-2

Ohio Improvement of the Method for Determining the Crude Fiber and Nitrogen-Free Extract (N.F.E.) of Feeds. To improve crude fiber method of analysis so that the crude fiber determination will be a measure of the fraction of the feed that is the undigestible carbohydrate fraction and the N.F.E. (by difference) is the readily digestible fraction.
Anim. Sci. 5

Ohio The In Vitro Digestibility of Cellulose from Various Sources and the Effect of Lignification Thereon. To (1) learn the digestibility (in vitro) of cellulose and cellulose-containing crude fiber fractions isolated from feedstuffs (corn cobs, oat hulls, wheat bran, alfalfa leaves and stems, timothy, and straws), (2) try to assess effect of lignification of materials on digestibility of cellulose in these materials.
Anim. Sci. 132 (NC-25)

Okla. Improving the Utilization of Low Quality Roughages. To determine (1) value of alfalfa ash in utilization of low-quality roughages; (2) mineral deficiencies of roughages, which are improved by addition of alfalfa ash; (3) effective combinations of inorganic elements for more efficient use of low-quality roughages; and (4) practical supplements to supply nutrient deficiencies of low-quality roughages.
Agr. Chem., Anim. Husb. 874

Okla. *Nutritional and Chemical Evaluations of the Castor Plant (Ricinus Communis)*. (1) Evaluate practicability of producing an animal feed from castor pomace, by removing toxins and the allergens. (2) Investigate biosynthesis of alkaloid, ricinine in seedling. (3) As data is obtained, broaden scope to include: learning biological value of protein of extracted pomace, learning amount of ricin, ricinine and allergen from castor pomaces derived from different varieties of *Ricinus communis*, learning amino acid content of these proteins, isolating and identifying new amino acids from ricin and allergen.
Biochem. 1009

Oreg. *The Development and Application to Feeding Practices of Techniques for Measuring Range Feed Consumption and Quality by Beef Cattle*. (1) Develop indicator technique to learn digestibility of mountain flood meadow hays in wintering ration. (2) Apply techniques to estimation of intake and digestibility of range forage by grazing beef cattle. (3) Study how to economically supplement sagebrush range for grazing beeves.
Anim. Husb. 264 (W-34)

Pa. *Utilization of Forage by Beef Cattle*. To (1) evaluate methods of utilizing high quality pasture and harvested forage in feeding beef cattle, (2) measure relative cost of beef production under feeding systems in which concentrates are replaced with pasture and harvested forage, and (3) evaluate relative quality of beef produced under various feeding systems used.
Agron., Anim. Husb. 1245

Pa. *The Nutritive Evaluation of Forages*. To learn (1&2) digestible dry matter, digestible protein, and digestible energy of forages of particular value in Northeast, using sheep as experimental subjects; (2) above constituents on forages produced by New Hampshire station for special cooperative studies. Metabolizable energy to be learned on 3 of forages. (3) Compare nutrient values of forages as measured by sheep with those measured by cattle, rabbits, chemical analysis, etc.
Anim. Nutr. 1263 (NE-24)

R. I. *Nutritive Evaluation of Forages*. Learn nutritive value of forages fed to dairy heifers as affected by stage of maturity, learn nutrient yield of forages fed per unit of land, study effect of stage of plant maturity on cellulose and lignin content.
Agron., Anim. and Dairy Husb., Chem. 304 (NE-24)

S. C. Growing and Fattening Steers on Common and Coastal Bermuda Pastures. To learn (1) grazing time of these pastures; (2) "carrying capacity" of pastures; (3) daily gains, gain per animal, gain per acre and cost of gains by steers on these grasses.
Anim. Husb., Chem. 107

S. Dak. Nutritive Value of Grasses and Hays of the Northern Great Plains. To obtain data on composition, digestibility, and productive value of pastures and hays.
Anim. Husb. 120

S. Dak. Handling, Storage, and Feeding of Grass Silage with Comparisons of Labor Requirements, Costs, Feeding Values, and Losses in Six Different Methods of Storage.--D. Chemical Analysis of Grass Silage with Different Methods of Storage. To (1) analyze newly ensiled samples for carotene, protein, ash, crude fiber, ether extract, nitrogen-free extract and moisture, and compare with analysis of samples taken at feeding time from silos; and (2) make moisture determinations on silage as it is weighed out to determine bulk losses at time of feeding.
Biochem. 237-D (NC-23)

S. Dak. The In Vitro and In Vivo Digestibility of Prairie Hay and Other Forages as Related to the Carbohydrate Components. (1) Study the *in vitro* digestibility of prairie hay and local forages with emphasis on carbohydrate fractions. (2) Conduct digestion trials in conjunction with *in vitro* studies in order to correlate differences of carbohydrate fraction content with nutritive value of forages.
Anim. Husb. 293 (NC-25)

Tenn. The Evaluation of Different Pasture Species in Various Combinations and at Varying Rates of Nitrogen Fertilization as Reflected in Beef Cattle Gains and Forage Yields. Evaluate different pasture species alone and in combinations and at varying rates of N fertilization as reflected in beef cattle gains and forage yields.
Agron. 52

Tenn. Factors Affecting Feed Utilization by Ruminants. (1) Learn and evaluate factors influencing rumen microbial activity. (2) Evaluate new chemicals or feed additives and learn their influence on rumen microorganisms and on utilization by ruminants of feeds common to State. (3) Learn methods of altering rate of feed passage thru digestive tract and ascertain what influence rate of feed passage has on feed utilization.
Anim. Husb., Vet. Sci. 71

Tenn. Evaluation of Roughages for Beef Cattle. Evaluate roughages common to Tennessee farms as grain silages, grass silages, hays, cottonseed hulls, etc., for beef production.
Anim. Husb., Vet. Sci. 72

Utah Nutritional Deficiencies in Range Forage and the Supplementary Feeding of Range Livestock. To (1) determine the botanical species and chemical composition of the diet of range livestock with special reference to deficient or excessive nutrients and toxic materials, (2) note effect on calf and lamb crop and other production factors after supplementing deficient diets or instituting preventive or corrective measures for diets with excessive or toxic materials which are consumed by range livestock, (3) develop techniques of handling range livestock for detailed experimental research, (4) study methods of determining digestibility and metabolizable energy content of various species and mixtures consumed by cattle on ranges. Sheep may be used for comparisons.
Anim. Husb., Range Mgt. 421 (W-34)

Vt. The Relationship of Date of Cutting to the Nutritive Value of Various Forages. Learn digestibility of energy and N (1) of 1st-cuttings of various mixtures grown in State when harvested on June 9 and July 15; (2) of aftermath growth when cut at various intervals. (3) Further investigate use of chromium oxide as an indicator of digestibility of hays and silages consumed by lactating dairy cows. (4) Learn effect of fertilization on digestibility of energy and N of forages cut at various stages of growth. (5) Develop pure stands of grasses and legumes found in majority of recommended forage mixtures of State to learn digestibility of energy and N when cut at various stages of growth.
Anim. and Dairy Husb. 66 (NE-24)

Va. The Determination of Certain Minor Elements in Forages, Feedstuff and Selected Animal Tissues. (1) Determine Co, Cu, Mn, Mo, & Zn in certain forage plants from Amelia, Nottoway, Powhatan Counties and if any areas are deficient in minor elements as shown by plant composition and animal response. (2) Make copper analysis of feedstuffs and animal tissues and other materials used in feeding of animals on Virginia forages low in Cu. (3) Learn Cu and Mo concentrations of tissues, rations and excreta of lab. rats in connection with Cu, Mo, S relationships.
Anim. Path, Biochem. and Nutr., Dairy Sci. 86012

Wash. The Effect of Various Constituents on the Utilization of Roughages by Pregnant Beef Cattle. (1) Compare weight gains of pregnant beef heifers and the percent and condition of their calf crop at birth when dams are wintered principally on either wheatgrass or wheat straw. (2) Learn extent of carotene inadequacy in wheatgrass as measured by liver storage of vitamin A, plasma carotene and vitamin A content. (3) Study effects of Co, Cu, Fe, Mn, and S and protein on digestibility of crude fiber in wheatgrass and wheat straw. (4) Learn adequacy of wheatgrass and wheat straw in regard to Co and Cu content. (5) Study protein deficiency of crested wheatgrass cured on stalk, and (6) protein use by pregnant heifers fed principally wheat straw and wheat grass thru determination of digestibility of crude protein and by learning blood nonprotein N. (7) Learn digestibility of rations containing wheatgrass and wheat straw.
Anim. Sci. 1242 (W-34) Coop. USDA

Wash. Improved Mid-Summer Range Forage for Beef Cattle in Eastern Washington. Test mid-summer grazing value of selected grass species for beef cattle under eastern Washington range conditions.
For. and Range Mgt. 1339

W. Va. Measuring the Nutritive Value of Forage Crops. Develop chemical and biological techniques for determination of nutritive value of forage crops.
Agr. Biochem., Agron. and Genet., Anim. Husb. 46 (NE-24)

Wyo. Grazing Studies on Seeded Pastures and Native Range. Learn (1) effect of 3 degrees of forage use of high mountain range on vegetational composition and cattle gains, (2) same when fed to sheep, (3) comparison of cattle gains from grazing 3 seeded grass species at optimum period of use with gains from native shortgrass, (4) effect of light use on rate of recovery of overgrazed shortgrass range and sheep gains from pastures as compared with good range lightly and moderately grazed, (5) longevity of certain seeded grass species and sheep gains compared from pastures of these species.
Agron., Anim. Prod. 586 Coop. ARS

Wyo. Range Livestock Nutrition. Determine digestibility of harvested forages and/or supplements used for wintering range livestock and chemical composition and nutritive value of range forage as related to performance of cattle and sheep. Develop more satisfactory methods of range nutrition research; compile and review data on range forage plants, poisonous plants and toxic materials in Wyoming forages.
Anim. Path., Chem. 613 (W-34)

(For additional information on this category see
Parts No. 4b, 5, and 10.)

Concentrates

Ariz. Amino Acid Proportions and Biological Utilization of Proteins in Sorghum Grains. Learn amino acid proportions and biological use of sorghum grain proteins and how these are affected by variety and fertilization.
Agr. Biochem. 313-2 (W-4)

Colo. Varying Amounts of Concentrates and Roughages in Cattle Fattening Rations. To determine effect of varying proportion of concentrates to roughages fed cattle on (1) feed use, measured by weight gain, feed eaten, and digestion trials; & (2) market outcome, measured by live and carcass grades, yield, shrink, degree of finish and economy of production.
Anim. Indus. 152

Hawaii Feeding Experiments with Livestock Designed to More Fully Determine the Possibilities and Proper Use of Locally Available By-Products. To more fully utilize by-products available in Hawaii and make the Territory more self-sufficient in the matter of meats and animal products.
Anim. Sci. 265

Idaho Concentrate-to-Hay Ratios for Growing and Fattening Cattle. To establish (1) optimum economical ratio of concentrate to hay for growth and fattening, and (2) minimum protein requirements for the various ratios of concentrate to hay.
Anim. Husb. 225

Ill. Evaluation of the Concept of Biological Value of Protein for Growth and Maintenance. To (1) learn relationship between protein quality and percentage of protein in diet required to produce maximum gain at different levels of intake of protein and of energy and (2) learn relationships between biological value of protein, protein concentration in diet, and energy intake.
Anim. Sci. 20-306

Ill. The Nutritive Value of Grains Grown Upon Rich and Poor Soils. To complete analyses of samples now on hand, statistical analyses of data accumulated over past several years and publication of the results.
Anim. Sci. 20-355

Ill. The Effect of Feeding the Soybean Plant or its Fractions on Animal Reproduction, Growth, Lactation, and Aging. To (1) learn cause for impaired reproduction and other physiological failures in female rabbit fed a diet composed of 49.5 parts soybean hay, 49.5 parts of ground wheat and 1 part NaCl, (2) extend study to dairy cattle and goats to learn reasons why soybean forage as a nutrient source has lost favor with dairymen in Illinois, (3) study soybean dietary factors as related to vitamins, hormones, and body metabolism.
Dairy Sci. 35-312

Ill. Supplementing Wintering Rations for Steer Calves. To study (1) grass silage, corn silage, and hay as a wintering ration for steer calves; and (2) combinations of soybean meal, corn, and feeding fat as a supplement for these roughages.
Dixon Springs 40-324

Ind. In Vitro Hydrolysis of Proteins by Enzymes. To (1) determine rate and extent of digestion of proteins in feed ingredients and mixed feed using various modifications of an in vitro enzymatic colorimetric method; and (2) compare values obtained above with in vivo digestion coefficients obtained on same samples of feed in rats, and with protein digestion coefficients of these feeds published for farm animals.
Biochem. 413

Miss. A Study of Levels of Protein and Energy Intake and Their Effect Upon Productive Efficiency of Beef Cattle. Learn protein and nutritional level most nearly optimum for highest production in beef cattle.
Anim. Husb. HE-3

Miss. A Study to Determine the Protein Requirement of Fattening Yearling Cattle. To learn amount of protein supplement needed by fattening yearling cattle fed on a basal ration of (1) oats and Johnson grass hay in dry lot, (2) corn and Johnson grass hay in dry lot.
Anim. Husb. HE-11

Mo. Rations for Fattening Cattle. To determine ways of improving the efficiency of a fattening ration through addition of molasses in various forms.
Anim. Husb. 237

Nebr. The Use and Value of Beef Tallow in Cattle Fattening Rations. To (1) determine effect of adding beef tallow to cattle fattening ration; (2) determine quantitative effect of edible and inedible beef tallow in a cattle fattening ration; and (3) compare effect of edible and inedible beef tallow in cattle fattening ration.
Anim. Husb. 447

Ohio Relationship Between Various Feeds or Nutrients and the Protein Requirements of Fattening Cattle. To (1) re-evaluate protein needs of fattening cattle, (2) determine effect of molasses, trace minerals, and other factors on utilization of protein and energy, and (3) relate objectives 1 and 2 to type and quality of roughage fed.
Anim. Sci. 30

Okla. Protein and Non-Protein Nitrogen Utilization by Ruminants. To determine (1) effect of different levels of carbohydrate in ration on use of protein, and other feed nutrients, by ruminants; (2) under practical feed-lot conditions, relative value of urea and how it may be used to best advantage in supplementing protein of rations for growing and fattening lambs; and (3) value of adding small amounts of methionine to rations containing urea and rations containing natural feed proteins.
Anim. Husb., Chem. 709

Okla. Effect of Various Concentrate-to-Roughage Ratios on the Feedlot Performance of Steers and Heifers. To (1) study effect of certain concentrate-to-roughage ratios for self-feeding fattening yearling steers and heifers to a rate of gain, b efficiency of feed utilization and economy of gain, c necessary time on feed to reach desired slaughter grade and d quality of carcass produced, and (2) compare performance of steers vs heifers within each level of concentrate to roughage.
Anim. Husb., Chem. 893 Coop. ARS

P. R. The Utilization of Concentrates in the Feeding of Livestock in Puerto Rico. To determine most economical quantities and qualities of concentrate feeds or grain mixtures that may be used satisfactorily for milk, meat, and egg production.
Anim. Husb. 44

S. C. The Economy and Rate of Gain and the Quality of Meat Produced by Steers Fattened in Dry Lot and on Winter Forage. To learn (1&2) relative cost of fattening steers in dry lot and on pasture with supplementary grain; relative value of such homegrown feeds as corn, milo and barley for steers fed on forage. (3) Compare quality of beef produced by steers fattened in dry lot and those fed on pasture.
Anim. Husb. 72

Texas An Evaluation of Animal and Vegetable Feeds with Respect to Chemical Composition and Feeding Value. Obtain reliable information on: (1) cystine content of farm feeds; (2) glycine content of farm feeds. (3) Learn nutritional significance of free lysine epsilon amino groups in various kinds of oilseed meals.
Anim. Husb., Biochem. and Nutr. 521

Vt. Microbial Protein for Feed Supplements. (1) Investigate micro-organisms for their ability to synthesize high quality protein which might be used as feed additives. (2) Learn if strain variability exists among micro-organisms with respect to ability to synthesize an essential amino acid, and to foster variability employing various cultural conditions and utilizing induced mutants.
Biochem. 11

W. Va. Methods to Increase Non-Protein Nitrogen Utilization by Ruminants. To evaluate a variety of non-protein nitrogenous compounds which may be useful as replacements for protein concentrates in ruminant rations containing a high proportion of roughage.
Anim. Husb., Biochem. 45

(For more information on research in this category see Parts 4b and 5.)

Feed Adjuvants

Calif. The Effects of Hormones on the Growth and Fattening of Meat Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, (4) mechanism by which hormones influence metabolic activities.

Anim. Indus. 1662 Coop. FES

Colo. The Effect of Hormones, Drugs and Similar Substances on Nutrition of Livestock. To learn (1) effect of these substances when fed as part of ration and when administered parenterally on feed lot responses and carcass grade and yield; (2) by individual digestion trials, influence of these substances on digestibility of feeds and efficiency of nutrient utilization; (3) by chemical and/or biological methods natural and added concentrations in feed stuffs of above, by chemical and biological methods residues of same deposited in organs and tissues, by gross and microscopic examination of organs and tissues any effect ascribable to treatment with these substances.

Anim. Invest. 182

Ga. The Use of Diethylstilbestrol Implants in Beef Production. (1) Compare oral administration and low level implantations of of stilbestrol in steers on various rations in dry lot. (2) Learn influence of low level implantations of stilbestrol in steer calves, and yearlings on different types of pasture. (3) Learn if previously implanted feeder cattle will respond to further stilbestrol treatment when fattened in feed lot. (4) Test relative effects of stilbestrol implants on potentially low and high gaining steers. (5) Further test possibility of a stilbestrol-phenothiazine interaction in calves. (6) Learn influence of low level implantations of stilbestrol on breeding efficiency of heifers when treated as calves and/or yearlings. (7) Learn if estrogenic residues are present in beef from steers implanted with low levels of stilbestrol.

Anim. Husb. 320

Ky. The Effect of Oxytetracycline and Diethylstilbestrol Additions on Fattening Steers Being Fed an Economy Supplement. Learn effect of (1) adding oxytetracycline to low cost supplements containing urea and trace minerals; (2) effect of implanted and orally fed diethylstilbestrol ($C_{18}H_{20}O_2$) to fattening steers in drylot being fed low cost supplements. (3) Gain further experience with a low cost supplement by feeding it in a heavy corn ration.

Anim. Husb., Anim. Nutr. 259

Ky. The Effect of Implanting Diethylstilbestrol, Progesterone and Estradiol Both With and Without Oxytetracycline on the Performance of Grazing Steers. Study effects of implanting (1) graded levels of diethylstilbestrol ($C_{18}H_{20}O_2$) and (2) a combination of 1000 mg. of progesterone ($C_{21}H_{30}O_2$) and 20 mg. of estradiol on the performance of yearling steers grazing bluegrass with and without addition of oxytetracycline in salt portion of ration.
Anim. Husb. 269

Miss. A Study of the Use of Diethylstilbestrol in Fattening Steers and Heifers. To learn value of above as feed supplement for fattening cattle and heifers under Mississippi conditions.
Anim. Husb. HE-12

N. J. The Role of Non-Nutritive Additives in Commercial Feeds. (1) Develop chemical and biological methods for testing and evaluating non-nutritive additives incorporated in feeds including improvement of current analytical methods; investigate chemical and physical changes of additives brought about by components within feeds. (2) Evaluate mixing procedures to obtain uniform mixtures of additives in premixes and in the finished feed. (3) Investigate fundamental physiological effects that non-nutritive additives may have on test animals, including antagonistic and synergistic effects of combinations of additives and nutritional value of feeds containing one or more of additives.
Agr. Chem. 104

Ohio The Influence of Sex Hormones Upon Growth Rate, Fattening, and Carcass Quality of Feeder Calves. To (1) compare growth rate, fattening, and carcass quality of steer and bull calves, (2) determine influence of diethylstilbestrol implants in steers and bulls upon performance in feed lot and upon quality of carcass, and (3) study excretion rate and carcass retention of stilbestrol after subcutaneous implantation.
Anim. Sci. 78-1 (NC-1)

Okla. The Effect of Certain Hormones and Feed Additives on Fattening Beef Calves. Study (1) effect of previous stilbestrol implantation as calves on the subsequent feed-lot performance of fattening steers; (2) effect of certain thyroid-inhibitory drugs on response to stilbestrol, with particular reference to carcass grade; (3) value of simple vs. complex protein supplements for fattening beef calves where stilbestrol is used to stimulate gains; (4) protein needs of beef calves as they may be affected by addition of stilbestrol to the ration.
Anim. Husb., Chem. 949

Okla. The Effect of Steroids on Microbial Metabolism and the Degradation of these Compounds by Microorganisms. (1) Study effect of diethylstilbestrol, hexestrol, progesterone, estradiol, and dienestrol on microbial oxidations and metabolism. Isolate and identify (2) organisms capable of degrading or using these compounds as sole sources of organic C; (3) degradation products and study effects of these compounds on microorganisms.
Bact. 976

Pa. The Role of Antibiotics in Protein Metabolism and Growth. To investigate effect of antibiotics on amino acid requirements, utilization of non-protein N, and metabolism of monogastric animals.
Anim. Nutr. 1219

Tenn. Studies of Endocrine Relationships in Farm Animals. C. Beef Cattle. To study (1) effects of steroid hormones on rate of growth, feed efficiency and carcass characteristics in beef cattle; and (2) role of endocrine system in reproduction and growth in beef cattle.
Anim. Husb., Vet. Sci. 60

Wash. The Effects of Animal Fat, Antibodies and Stilbestrol Administered to Fattening Steers Consuming Good and Poor Quality Roughage. To (1) determine the influence of high levels of animal fats in ruminants ration on: a. digestibility and efficiency of utilization of the fat and associated dietary constituents; b. vitamin A stores in the liver; c. characteristics of the deposited fat; d. the retention of yellow pigments in the depot fat; and e. total blood lipids; (2) determine the influence of dietary stilbestrol and/or aureomycin on feed efficiency, digestibility of high and low fat and good and poor quality roughage diets; (3) determine the influence of high levels of dietary fat on utilization of pasture; (4) determine the influence of site of introduction of fat and aureomycin deposition on digestibility of feed nutrients; and (5) determine the effects of animal fat, aureomycin and stilbestrol on carcass characteristics.
Anim. Husb. 1217

Wyo. The Effect of Stilbestrol on the Performance and Carcasses of Steers. To study effect of feeding stilbestrol (1) to steers on rate of gain and feed efficiency, (2) on yield, carcass grade, shrink in storage, quality, and composition of carcass.
Anim. Prod., Chem., Vet. Sci. and Bact. 599

(For more information on research in this category see Parts 4b, 4c, 5.)

Minerals

Calif. Mineral Metabolism in Animals.--I. Molybdenum Toxicity in Ruminants. II. Copper and Molybdenum Relations in Cattle and Sheep. III. Phosphorus Metabolism Using Low and High Phosphorus Forage. Iv. Salt Metabolism in Sheep. Tolerance of Sheep to High Intakes of Salt. V. Investigation of Mineral Deficiencies in Range Lands. (1) To study effect of a low phosphorus diet on reproduction; (2) to continue search for a goitrogenic substance in the water from Hat Creek and (3) to study nutritional conditions in various parts of the State where livestock production cannot be maintained at a maximum level on native vegetation alone.
Anim. Husb. 938

Colo. Mineral Nutrition and Biological Efficiency of Livestock Production Phase I. The Progressive Variation of the Calcium: Phosphorus Ratio in Growth, Maturation and Fattening. Learn (1) nature of metabolic Ca:P ratio variation with changing age; (2) relationship of Ca:P ratio with nature and degree of fattening. Study (3) biochemical role of Ca in fat deposition; (4) effect of Ca on digestibility and rate of movement of injesta through the alimentary tract.
Anim. Indus. 120

Fla. Mineral Requirements of Cattle. To investigate role of mineral elements in nutrition of cattle, with particular emphasis on interrelationships of elements in development of nutritional abnormalities observed in Florida.
Anim. Husb. and Nutr., Dairy Husb. 133

Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.
Anim. Husb. and Nutr. 346

Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
Anim. Husb. and Nutr. 566

Ill. Studies of Trace Mineral Requirements and Metabolism in Animals. Investigate requirements for, and functions and metabolism of, trace mineral elements in several species of animals.
Anim. Nutr., Anim. Sci. 20-359

La. Nutritional Studies with Beef Cattle with Emphasis Upon Mineral Metabolism. (1) Study and separate the possible factor/s present in or missing from forages that might prevent normal response or development when fed to growing beef cattle. (2) Make special study of "trace mineral" deficiency and excesses and mineral-vitamin-hormone interrelation known to affect animal growth. (3) Apply radio-isotope procedures concurrently with accepted indicator methods for differential measurement of animal growth and response to rations in terms of fat, muscle, and bone. (4) If mineral deficiencies are shown in forage grasses, use radioisotope procedures to learn specific availability and animal requirements. (5) Formulate ration supplements for alleviation of deficiency. (6) Make other needed studies to clarify, evaluate, and separate factor/s associated with this problem.
Anim. Indus. 916

Mo. The Mineral Nutrition of Ruminants. To (1) reevaluate qualitative and quantitative mineral requirements of ruminants, (2) learn mineral element(s) or combination of elements in alfalfa ash which is (are) effective in stimulating appetite and improving performance of cattle and sheep fed low quality roughage, and (3) obtain more data on role of mineral imbalances in etiology of "stiff lamb" disease, urinary calculi, and tetany.
Anim. Husb. 248

Mont. The Calcium, Phosphorus, Magnesium, and Vitamin A Content of the Blood of Hereford Cows and Their Calves at the U. S. Range Livestock Experiment Station. To correlate the Ca, P, Mg, and vitamin A content of blood of cows and calves on range with analyses of soil and range plants from pastures on which cattle are grazed, with the rates of growth and reproduction of the cows, and with development of urinary calculi on calves.
Vet. Res. 52, M. S. 825

Mont. Mineral Nutrition of Cattle. To learn (1) effect of self-feeding weaned beef steer calves mineral mixtures varying in percent P and Ca-P ratio as supplements to a wintering ration; (2) effect of vitamins A and D, flavors or ingredients other than minerals upon utilization and consumption of mineral supplements by beef steers; (3) effect of mineral mixtures on growth, weight gains, and blood composition of calves.
Anim. Indus., Range Mgt. 110, M. S. 982

N. C. Investigations on the Metabolism of Minerals by Ruminants. 1. The Effects of Variations in the Calcium: Phosphorus Ratio on Cattle and Sheep. Learn optimum Ca: P ratio or the range over which the ratio may vary without untoward effects on cattle and sheep performance. (2) Study effects of variations in dietary Ca and P on trace element metabolism of ruminants.
Anim. Indus. 148

Okla. The Availability to Ruminant Animals of Phosphorus in Various Phosphorus Supplements. To learn (1) relationship between P intake and gain in weight, bone calcification, inorganic P level of blood plasma, true digestibility of P and balance of P in steer calves; and (2) availability to steer calves of P contained in certain mineral supplements and feeds.
Anim. Husb., Chem. 880

Okla. Effects of Phosphorus and Other Minerals in Fattening Steer Rations. (1) Study effect of increased levels of P in fattening steer rations on appetite, weight gains, efficiency of feed conversion and carcass merit. (2) Learn P needs of fattening yearlings given stilbestrol. (3) Study effect of varying Ca:P ratios, and interrelation between certain minerals, in fattening rations.
Anim. Husb. 996

Oreg. The Role of Minor Elements in Animal Nutrition. To determine the distribution of "trace" or "minor" elements of importance in animal nutrition and livestock disorders. To apply this information to problems in the fields of nutrition and livestock production.
Agr. Chem. 154

Tenn. Mineral Metabolism in Animals.--I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine and sheep, and to study thereby in detail the normal absorption, utilization and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals; and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc. upon the availability; and (4) apply radioisotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.
Anim. Husb., Vet. Sci. 63 Coop. AEC

Tenn. Mineral Metabolism in Animals:--II. Interrelationships of Calcium and Phosphorus with Vitamins, Minerals, Hormones, and Other Factors. To (1) investigate and separate effect of metabolism of calcium and P certain important factors which are known to influence their behavior in the animal body; and (2) study such elements and substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms and to aid in explanation of toxicological properties.
Anim. Husb., Vet. Sci. 64 Coop. AEC

Wis. Mineral Metabolism and Mineral Requirement of Animals. To study (1) effect of mineral supplements of various kinds on animals fed low lime rations, (2) role of inorganic compounds containing such elements as Fe, Cu, Ni, Co, Zn, and Mn and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.
Anim. Husb., Chem. 8

Wyo. The Metabolism and Chemical Binding of Selenium in the Tissues. Learn (1) localization and synthesis of organo-selenium compounds *in vivo* by radioactive selenium; (2) if selenium compounds in plant and animal tissues are similar in structure to sulfur containing amino acids; (3) biological activity of isolated compounds, if chemical combination occurs; (4) site of action of selenium in animal tissues by enzymatic method.
Agr. Res. Chem. 639

Wyo. The Toxic Effects of Sublethal Amounts of Potassium Nitrate on Animals. Learn effects of diets containing sublethal amounts of potassium nitrate and/or potassium nitrite on (1) pregnant animals; (2) lactating animals and their young. (3) Learn growth rate of animals on diets containing sublethal amounts of potassium nitrate and/or potassium nitrite.
Agr. Res. Chem., Agron., Bact., Vet. Sci. 675

Wyo. Chemical Examination of STANLEYA BIPINNATA and ASTRAGALUS PECTINATUS. (1&2) Separate, purify, and study chemical and physical properties of major selenium compounds and some of important non-selenium containing compounds present in *Stanleya bipinnata* and *Astragalus pectinatus*. (3) Identify compounds isolated and purified above. (4) Attempt a therapeutic treatment to counteract effects of isolated selenium-containing compounds.
Agr. Res. Chem. 677

(For additional information on this category see Parts 4b and 5.)

Vitamins

Colo. Vitamin A Nutrition of Beef Cattle in Colorado. IV. Vitamin A Nutrition in Relation to Other Nutrients in the Growth and Development of Young Beef Cattle. To study (1) vitamin A nutrition in relation to other nutrients in growth and development of young beef cattle in relation to protein level, and to mineral levels and balance; and (2) vitamin nutrition in relation to other nutrients in gestation, parturition, and lactation in beef cows.
Anim. Invest. 24-IV

Iowa Sulfonated Sterols in Nutrition. Elucidate action of antirachitic vitamin on theory that in vivo sulfonations are induced by vitamin D. Learn location of sulfonic acid group in antirachitic cholestatetraene sulfonic acid. Synthesize analogous derivatives with and without radioactive carbon. Correlate biological activity.
Chem. 1115

Nev. The Relationship of Food Accessory Substances and Infection to White Muscle Disease of Calves. To determine relationship of vitamin E or other food accessory substances and inapparent virus or other infections to this disease.
Chem., Vet. Sci. 86

Okla. The Correlation of Vitamin A Liver Stores with Plasma Vitamin A in Cattle. To (1) study storage of carotene and vitamin A and the use of such stores by beef cows during maintenance, reproduction, and lactation--(a) study correlation of liver and plasma vitamin A levels in cows during reproduction and lactation; (b) correlate liver stores and plasma lavels and vitamin A and carotene with the amount in the diet and milk; (c) study effect of body reserves of vitamin A and carotene of cow on the liver and plasma levels of the calf at birth and during the nursing period; and (2) study effect of level of carotene intake and other dietary conditions on the absorption and utilization of carotene by steers.
Agr. Chem., Anim. Husb. 747

Okla. Correlation of Vitamin A Liver Stores with Plasma Vitamin A in Cattle. (1) Study in sheep the extra-intestinal site of conversion of carotene to Vitamin A; (2) extend to other species the in vivo studies of injected carotene conversion to Vitamin A. (3) Evaluate effect of factors likely to effect carotene conversion to Vitamin A upon the conversion of injected carotene in sheep.
Agr. Chem., Vet. Med. 747 Supplement

Wis. Effect of Vitamins, Amino Acids, and Other Organic Nutrients on the Growth, Milk Production and Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.

Anim. Husb., Biochem. 10

(For additional information on this category see Parts 1, 4b, 4c, 5, 19.)

MANAGEMENT

Ariz. Resource Requirements, Management Practices, and Measures of Efficiency in Feedlot Operations. Learn capital investments needed for feeding yards, feed mills, and other equipment and labor requirements for different sizes of feeding operations. Compare different practices with costs of operations and net returns. Determine standards of physical and economic efficiency in operation of cattle feeding yards. Establish standards with respect to feeder-slaughter cattle price spreads as related to feed and other costs.
Agr. Econ., Anim. Indus. 381

Ark. The Determination of Production Requirements and Returns for the Different Methods of Handling Beef Calves and an Economic Evaluation of the Alternatives. (1) Learn methods used in handling beef calves, (2) Learn production requirements and returns for different methods. (3) Develop budgets for handling methods using production requirements under farm conditions, experimental data and current and anticipated prices. (4) Make an economic evaluation of alternative methods of handling calves for typical farm situations.
Agr. Econ. & Rural Sociol. 420

Ark. Effect of Pre-Slaughter Handling and Treatment on Carcass Quality and Market Value. Study methods for improving value of meat produced through management of stock during pre-slaughter period and after completion of farm feeding period.
Anim. Indus., Vet. Sci., Agr. Econ. & Rural Sociol. 446

Colo. Enterotoxemia of Cattle. To (1) determine what toxins, and particularly which of toxins of *Clostridium perfringens* may be responsible for several disease manifestations in cattle; (2) study toxogenic bacteria found in digestive system; (3) investigate factors which might be conducive to production of toxins in gastro-intestinal tract; (4) attempt to determine economic importance of disease; (5) determine if any relationship exists between enterotoxemia of sheep and similar conditions in cattle; and (6) investigate possible means of control or treatment.
Path. & Bact. 76

Ga. Evaluation of Systems of Beef Production Through Operations of Experimental Farm Units. To compare returns from (1) cow and calf systems with and without winter grazing; and (2) purchased feeder cattle system with returns from a cow and calf system.
Agr. Econ., Anim. Indus. 3

Ga. Investigation of Some Factors Influencing Gains and Weaning Weight of Beef Calves. Study (1) effect of levels of milk and forage intake at different periods, and interrelationships between them, upon the gains and weaning weight and finish of beef calves; (2) efficiency in use of forages and other feeds by beef calves.
Anim. Indus. 52

Ga. Effect of Pasture Management on Control of Internal Parasites of Cattle. To learn the degree and type of internal parasitic infections as found under different systems of pasture management and devise control measures if and where needed.
Anim. Indus. 59 Coop. ARS

Ind. The Economics of Cattle Raising in Southern Indiana. (1) Learn financial results of beef cattle production with various sizes of herds and current techniques. (2) Appraise opportunities for improving incomes by adapting better practices. (3) Obtain beef cattle input-output information, in physical quantities, useful to individual farmers, public agencies, credit agencies, and others.
Anim. Husb., Agr. Econ., Agron. 821 Coop. USDA

Ind. Feeder Cattle: Systems of Management; Feed, Labor, and Capital Requirements. (1) Deductively develop: costs, margins, and returns of different systems of feeder cattle management by assembling available input-output data. (2) Obtain cost and return data with regard to 3 or 4 most popular systems; relate size of enterprise, feed, labor, and capital needs, feed and manure handling techniques to cost and return data. (3) Evaluate some of newer and more nearly automatic systems of feeding; compare hand feeding, self feeding, mechanical, and automatic feed handling. (4) Reconcile above developed data, and illustrate how input-output information with regard to various feeder systems can be applied to problems of farm organization.
Anim. Husb., Agr. Econ. 951

Iowa

Intensive Beef Cattle Farming on Iowa Corn Lands. To learn (1) economic feasibility of an intensive type of beef enterprise on heavy corn production land where a cow herd utilizes the total roughage feeds and the calves consume harvested grain; (2) value of cornstalks as feed for beef brood cows from early fall until spring; (3) methods of feeding cows and nursing calves in drylot green forage clippings in making maximum economic usage of soil conservation crops in corn rotations; (4) manure management systems returning maximum fertility to soil from cattle confined on concrete or in drylot; (5) best methods of harvesting and storing cornstalks which are economical and produce satisfactory feeds; (6) phases of livestock management and cropping systems best suited for intensive production.

Anim. Husb., Agr. Engin., Agron., Agr. Econ. 1307

Kans.

Factors Influencing Profitable Grass Utilization and Sound Pasture Management -- 1. Wintering and Grazing Steer Calves. To determine effects of different wintering regimes on subsequent pasture gains and the value of supplements fed after mid-summer.

Anim. Husb., Agron. 253-1

Kans.

Factors Influencing Profitable Grass Utilization and Sound Pasture Management -- 2. Wintering, Grazing and Fattening Heifers. To (1) develop a system of deferred full feeding for heifer calves; (2) compare different rations for heifers; and (3) compare various methods of finishing heifers.

Anim. Husb. 253-2

Kans.

Factors Influencing Profitable Grass Utilization and Sound Pasture Management -- 4. Wintering and Grazing Yearling Steers. To (1) develop methods of wintering and grazing yearling steers; (2) determine optimum level of protein feeding during the winter on dry bluestem pasture; and (3) determine effect of feeding a protein supplement during latter part of grazing season to 2-yr.-old steers on bluestem grass.

Anim. Husb. 253-4

Kans.

Factors Influencing Profitable Grass Utilization and Sound Pasture Management -- 6. Wintering, Grazing and Fattening Steers. To (1) compare self-feeding grain on grass after August 1 with self-feeding grain in drylot; and (2) determine value of trace minerals in cattle program which uses bluestem pasture.

Anim. Husb. 253-6

Mo. *Beef Cattle Feeding and Management* -- *a. Production of Young Beeves.* To (1) determine advantages and disadvantages accruing to Jan.-Febr. and March-April dropped calves when both groups are fed grain while suckling dams on pasture and fattened, post weaning to same degree of finish, (2) discover production needs of "improved" pastures, concentrates, and management; (3) study carcass quality and grade; and (4) unveil production problems currently unrecognized.
Anim. Husb. 78

Mo. *Forage Poisoning Caused by Drought.* To (1) develop a quick chemical test to predict if forage would be toxic to farm animals, (2) learn if the toxicity of forage declines after ensiling, and (3) study physiological effects of high nitrate intake on farm animals and investigate ways of counteracting the effects.
Chem. 247

Nebr. *Methods of Feeding Cattle from the Standpoint of Experimental Design.* To learn and evaluate differences in response of cattle to different feeding methods.
Anim. Husb. 440

N. Y. (Cornell) *The Development of Materials Handling Methods and Equipment for Reducing Labor in Caring for Livestock Including Reference to Harvesting, Processing, Storing, and Feeding.* To develop suitable methods and equipment for handling materials necessary for livestock feeding and care in order to reduce manual labor now required, so that it should be possible to increase the output per man, hence reduce unit cost of production.
Agr. Engin., Anim. Husb. 35 (NE-13)

Okla. *The Control of External Parasites.* To (1) develop effective repellents to protect animals from external parasites, especially those with resistance to common toxicants; (2) evaluate effectiveness and hazards of new chemicals as pest toxicants; (3) determine best methods to apply insecticides to animals, especially automatic sprayers, rubbing posts and treadle machines; (4) obtain biological data to assist in above objectives; and (5) obtain adequate data indicating gains to be expected from parasite control.
Anim. Husb. 593

Okla. Relation of Nutrition and Age at First Calving to Lifetime Performance of Beef Cows. To repeat certain phases of the original study in attempts to more clearly define effects of low, medium, and high levels of supplemental winter feed on the growth and development of beef heifers, the difficulty encountered at first calving, and subsequent reproductive performance.
Anim. Husb., Chem. 650 Coop. ARS

Okla. An Economic Evaluation of Systems of Beef Production in Oklahoma. (1) Assemble relevant physical and economic data relating to production of beef in State and analyze economic consequences of alternative production practices and beef enterprises under various price-cost relationships. (2) Examine alternative feed production and utilization systems with special reference to costs, and to price and weather uncertainty and net returns. (3) Evaluate alternative individual production practices in terms of total farm and ranch organization and management.
Agr. Econ., Anim. Husb. 911 (S-27) Coop. ARS, TVA

S. C. Methods of Management of Slaughter Cattle. Learn (1) most practical systems of producing slaughter cattle; (2) desirability of carcasses produced by these systems.
Anim. Husb. 132

Texas Management of Cattle as Related to Parasite Fauna and Parasitic Infections in Texas. (1) Learn which parasites of cattle are of greatest economic importance and relate prevalence of these to soil topography and climatic conditions with reference to areas other than the Gulf Coast. (2) Evaluate influence of rotational grazing, supplementary feeding, and fencing of marshes on parasitic infections of cattle in such a way that topographical regions are represented.
Vet. Med. 1104 (S-21) Coop. ARS

Wyo. Cattle and Sheep Ranch Management for Most Efficient Production. To learn (1) most important factors that influence profits and losses, and methods for their improvement; (2) best management practices under given conditions and methods for bringing about their use on more ranches; (3) proper rate of stocking for maximum beef, lamb, wool, and forage production over a period of years; (4) best winter feeding practices for most economical production; (5) proper balance between feed resources and animal units, feed costs and livestock prices, feeder prices and slaughter prices, and proper adjustments between price and what the producer received per pound, and cost per pound for feedlot gains; and (6) proper amount of investment in different enterprises on ranch and its percent of all costs.

Agr. Econ. 500

CARCASS EVALUATION AND MEAT

Calif. Marketability of Beef as Affected by Age, Breed, and Environmental Stress (Drought) Prior to Fattening. Learn to what extent the quality of meat within a given Federal grade is influenced by breed, age, or environmental stress of animals prior to fattening in order to provide basic data for more precise grading.
Anim. Husb. ES-534

Calif. Tenderness of Beef. 1. Changes Due to Treatment During Cold Storage. To study (1) tenderness of beef after varying lengths of cold storage, (2) alternation in pattern of tenderness changes due to removal of muscles from carcass immediately after slaughter, (3) role of enzymatic activity in altering tenderness of beef.
Home Econ., Anim. Indus. 1668

Colo. The Use of the Somascope and/or other Physical or Chemical Means for Improving the Accuracy of Determining Market Grades in Live Slaughter Cattle. Learn depth and distribution of fat on live slaughter cattle and if any relationships exist between finish of same and their carcass grade and/or qualities of meat when cooked. Establish objective grade specifications based on finish and other characteristics for use with somascope and other chemical means of grading and test to see if these are feasible and economically efficient means. Investigate specific gravity as a procedure for measuring marbling of selected muscles and relationship of marbling with carcass grade and quality of cooked beef.
Home Econ., Agr. Econ., Anim. Indus. 27

Ga. Carcass and Meat Characteristics as Influenced by Breeding, Feeding and Management Treatments in Cattle, Sheep and Swine. (1) Obtain data on carcasses fattened on grass, drylot, or combinations of these under local conditions. (2) Study relationship of breeding, feeding, and management treatments on carcass and meat characteristics. (3) Use above data in developing procedures for producing meat for consumer preferred type animals.
Anim. Indus. 113

Ill. Factors Affecting Quality of Beef Carcasses. Study validity of measures of quality as currently used by beef trade, develop precise objective measures of factors which contribute to beef quality, relate factors which contribute to carcass quality to those which can be measured easily in live animals.
Anim. Indus., Agr. Econ. 20-371

Iowa The Influence of Dietary Supplementation Selection and Breeding on Carcass Quality, and Tissue Composition of Meat Animals. To determine (1) effects of protein, fat, antibiotics, trace minerals, calcium and phosphorus of rations on carcass quality and tissue composition; (2) effect of roughage, protein and protein substitutes, and hormones on quality of lamb and beef carcasses; and (3) make additional studies, largely biochemical, to support objectives above.
Anim. Husb. 1239

Iowa Beef Skeletal Muscle Connective Tissue in Relation to Tenderness in Meat. Investigate fundamental causes of the toughness or tenderness of meats and evaluate connective tissue of beef skeletal muscles as they relate to these problems.
Home Econ., Anim. Husb. 1313

Kans. Enzymatic Separation Applied to the Determination of Collagen in Meat. To determine effectiveness of certain proteolytic enzyme preparations in releasing collagen from combination, association, or entanglement with contiguous muscle protein structures.
Home Econ., Chem. 419

Ky. Factors Affecting Carcass Characteristics of Beef Cattle. Evaluate factors affecting carcass characteristics of beef as produced in State: creep feeding of beef produced by Kentucky Cow and Calf plan; effects of breed of dam (Red Poll and Hereford) when bred to same Hereford bull, on quality of beef; effect of different pasture forages on eating quality of beef.
Anim. Husb. 267

La. Acceptability of Selected Retail Cuts from Beef Cattle Produced Under Different Managerial Practices. (1) Identify and evaluate characteristics suitable for predicting eating quality of beef. (2) Study flavor, tenderness, and general acceptance of beef from cattle fed and bred differently. (3) Study flavor, tenderness, and general acceptance as related to fat, moisture, and elastin and collagen content of cut and market grades. (4) Learn relative cooking losses of pre-fabricated beef cuts from animals produced under different managerial practices and to relate these to chemical and palatability measurements.
Home Econ., Anim. Indus. 943 (SM-19)

Minn. Factors Affecting Market Quality of Beef Cattle Carcasses. To (1) learn effects of stilbestrol on beef carcass quality, (2) learn market value of carcasses from cattle having been fed stilbestrol, (3) relate characteristics concerning market quality of beef carcasses to such production factors as growth rate, rations, and feed use, (4) compare moisture and fat content samples from carcasses, (5) learn cooler shrinkage on the carcasses.
Anim. Husb. 1413

Mo. Effect of Antemortem Handling During Marketing on Subsequent Carcass Quality of Beef. To study influence of exercise, rest, feeding and other factors which may produce shock in the live animal and a loss in quality in the resultant beef carcass.
Anim. Husb. 238

Mo. Control of Microbial Development During Meat Processing. To control microbial development during meat processing by use of ultra violet radiation.
Anim. Husb. 257

Nebr. Beef Carcass Evaluation. Learn: (1) factors contributing to carcass desirability and their relative importance; (2) relation between economically important carcass traits and measurable differences in live animal characteristics; (3) factors that contribute to consumer selection of different retail cuts.
Anim. Husb., Agr. Econ. 541 Coop. ARS

N. Y. (Cornell) Means of Improving the Meat Quality of Slaughter Dairy Cows. Learn effects of estrogen treatments on slaughter dairy cows of advanced age during a 6-8 week feeding period.
Anim. Husb., Dairy Indus. 67

N. C. Techniques for the Objective Evaluation of Pork and Beef Carcasses. (1) Develop techniques useful in appraising pork and beef carcasses. (2) Appraise some of present objective methods now in use for meat quality evaluation.
Anim. Indus. HM-12 Coop. USDA

N. C. Techniques for the Objective Evaluation of Beef Carcasses and Cuts. (1) Develop techniques applicable for use in the objective appraisal of beef carcasses and cuts. (2) Appraise some of present objective methods now being used in meat quality evaluation.
Anim. Indus. HM-12 (SM-19) Coop. USDA

N. Dak. The Extent, Nature and Causes of Variation in Carcass Value of Cattle. (1) Develop measures for carcass evaluation for learning difference in consumptive value and quality. Learn (2) extent and source of variation in percent of lean, fat, and bone and quality determinations in carcasses; (3) correlation of percent of lean to size of various muscles and bones which might be measured. Study (4) relation of glandular size to carcass characteristics; (5) efficiency of various methods of estimating outside cover of fat. (6) Compare live vs. carcass grades and cut-out values of carcass of different grades under different price-quality relations. (7) Learn repeatability of variations in carcass characteristics of genetically related steers.
Anim. Husb., Vet. Sci., Agr. Econ. 7-10

Ohio Studies in the Processing of Fresh Meat — Biochemical and Bacteriological Studies Fundamental to the Processing of Fresh Meat. To find methods of processing fresh meat which will upgrade the less desirable carcasses; permit greater quality control along the lines of palatableness; diminish the great variation in consumer acceptability resulting from breeding, nutrition, and handling; augment effectiveness of refrigeration in preserving meat; and prevent certain spoilage such as "bone sour".
Anim. Sci. 70

Okla. Development of Objective Criterion for Beef Evaluation. Develop: (1) objective criteria for evaluation of beef; (2) tools for use in objective evaluation of beef.
Anim. Husb. 998 (SM-19)

S. C. The Effect of Feeds on Color and Firmness of Beef Fat. To learn (1) effect of green forage and subsequent drylot feeding on carotene and xanthophyll content (color) of beef fat, color of lean, firmness (iodine number) of beef fat; (2) rate of carotene and xanthophyll depletion during drylot feeding; (3) rate of change of unsaturated fatty acids (firmness) during drylot feeding.
Anim. Husb., Chem. 80

S. C. The Effects of Color and Firmness of Beef Fat on Beef Prices. To learn if color and firmness of beef fat affect price and if so, to what extent: at wholesale level, retail level, and at consumption level.
Agr. Econ. 94

Tenn. Type and Breed as Factors Influencing Beef Carcass Characteristics and Consumer Acceptance. Relate carcass characteristics of beef and dairy animals varying greatly in conformation to consumer preferences and acceptance; compare values of retail cuts from experimental animals as evaluated at retail level with characteristics of carcasses from which they came as evaluated at wholesale level; use information from above to improve standards for evaluating carcasses at wholesale level and for evaluating conformation in beef breeding stock. Learn necessary inputs per pound of edible meat produced by animals varying greatly in conformation. This will be in nature of by-product information and will be available since animals will be raised under controls to insure that differences observed will be those resulting from differences in conformation and not previous treatment.
Agr. Econ. & Rural Sociol. 12

Tenn. Ripening of Beef from Cattle Produced under Different Feeding Methods as Related to Palatability, Tenderness and B-Vitamin Content. Study flavor, tenderness, and vitamin B-complex content of beef from cattle finished mostly on grass, and effects of various degrees of ripening on flavor, tenderness, and vitamin B-complex content of beef. Learn if there is an optimum degree of ripening for given grade of beef which will make best quality meat, considering flavor, tenderness and vitamin B-complex content. Measure cooking effect on B-complex.
Anim. Husb., Vet. Sci. 67

Tenn. *Carcass Value Investigations with Beef.* Ascertain possibility of developing methods for objectively evaluating quality factors in beef. Learn effect of consumer acceptance as basis for improvement in methods of beef production and marketing.
Anim. Husb., Vet. Sci., Agr. Econ. 68

Texas *Characterization of Eating Quality of the Meat from Individual Animals.* Characterize (1) eating quality of meat from individual animals of known history by using more than one cut and more than one method of cooking; (2) eating quality of cooked and raw meat from individual animals by associating eating quality with variations in collagen content, amino acid end-groups, and histological structure.
Home Econ., Biochem. & Nutr. 941 (S-10)

Texas *Decision Making Factors in Block Beef Purchases and Their Relation to Beef Acceptability as Determined by Objective Tests and Panel Ratings on Carcasses from Cattle of Known History.* To identify and evaluate (1) decision making factors in block beef purchases; (2) characteristics suitable for predicting eating quality of beef. (3) Recommend classification of block beef supply according to preferences of consumer and wholesale buyers.
Anim. Husb., Home Econ., Agr. Econ. & Sociol. 1093 (SM-19) Coop. ARS

Utah *Chemical Techniques for Detecting Flavor Changes During Meat Processing.* Develop chemical techniques for rapid and reliable evaluation of flavor of processed meat. Correlate chemical techniques for evaluating flavor of same with organoleptic test on man.
Bot. & Plant Path., Foods & Nutr. 458

Va. *The Effect of Different Methods of Feeding on the Patterns of Growth and Carcass Composition of Cattle and the Evaluation of Techniques and the Development of New Techniques for Studying Carcass Composition.* To learn carcass composition by dissection and chemical analysis of cattle on different methods of feeding at various ages and weights. Evaluate and develop techniques for use in live animal indicative of carcass composition — live animal probe as a measure of fatness, body water *in vivo* and its relationship to carcass composition.
Anim. Indus. 86071

Wis. Market Value and Nutritional Quality of the Meat From Livestock Receiving Stilbestrol. To learn (1) effect of diethylstilbestrol added to various rations on carcass quality, weight gains and feed efficiency of beef cattle, (2) effect of stilbestrol on nutritive value of carcass, (3) effect of ingested stilbestrol on concentrations and distribution of fat, protein, water, vitamins, and estrogenic activity in bodies of beef cattle.

Anim. Husb., Biochem., Genet. 967

REGIONAL PROJECTS

NC-1 Improvement of Beef Cattle Through Breeding Methods. To (1) determine the characters important in beef production and their relative value; (2) develop methods of measurement of important characters and determine their heritability values; (3) determine the relationship of performance characters, such as body size, conformation, rate of gain, and efficiency of gain, to net value; (4) determine the effectiveness of selection, inbreeding, cross-breeding, line-crossing and out-breeding -- and combinations of these -- as a means of producing more productive beef cattle; (5) determine the productiveness of existing stocks of beef cattle and their adaptability in various areas under different systems of management; (6) determine the mode of inheritance of defects, lethals, and semi-lethals, and methods of controlling same; (7) develop practical procedures which can be used to breed beef cattle capable of high production efficiency and superior carcass qualities.

Contributing projects: Ill., Iowa, Kans., Mich., Mo., Nebr., Ohio, Okla., S. Dak., Wis. (All projects in I.)

NC-25 Factors Affecting the Utilization of Feed by Ruminants. To improve the utilization of roughage, the basic constituent of ruminant rations by: (1) Determining the utilization of carbohydrate fractions, including the end products of fermentation (e.g. organic acids). (2) Determining protein and/or non-protein nitrogen requirements and utilization under different feeding conditions and different types of production. (3) Determining the requirement and physiological functions of minerals as well as their content in various feeds, with particular emphasis on the minor elements. (4) Determining the identity and the quantitative requirements of unidentified factors. (5) Determining methods of making more efficient use of rumen microorganisms.

Contributing projects: Ill. III-A, Ill. III-B, Ind. III-B. Iowa II-C, Kans. II-C, Mich. III-B, Minn. III-B, Mo. III-A Nebr. III-B, N. Dak. II-C, Ohio III-B, S. Dak. III-B.

NC-27 Causes and Control of Bloat in Ruminants. To (1) determine the physical and chemical characteristics of alfalfa and Ladino clover and fattening rations associated with bloat; (2) determine the physical and chemical characteristics of rumen ingesta from normal and bloated animals; (3) study the physiologic responses of ruminants to bloat-producing feeds, chemicals and procedures; (4) develop and elucidate measures for the control of bloat.

Contributing projects: Ind., Iowa, Mich., Minn., Ohio, S. Dak. (All projects in II-C.)

NE-24 The Nutritive Evaluation of Forages. To (1) evaluate various forages grown under known conditions and harvested at specific stages of maturity by determining digestible protein and digestible energy; (2) develop methods for the nutritive evaluation of forages: these to include the use of small animals and chemical analyses; (3) conduct animal production trials simultaneously insofar as possible.

Contributing projects: Del., Maine, Md., Mass., N. H., N. J., N. Y. (Cornell), Pa., R. I., Vt., W. Va. (All projects in III-B.)

S-10 The Improvement of Beef Cattle for the Southern Region Through Breeding Methods. To (1) develop breeding methods, selection criteria, and procedures which will result in beef cattle capable of higher productive efficiency and superior market qualities of product; (2) develop beef cattle with higher reproductive efficiency, greater longevity, and other aspects of lifetime productive efficiency; (3) develop beef cattle especially adapted to conditions in various environments of the region; (4) explore the usefulness of systems of breeding as a. Inbreeding, b. Crossbreeding, c. Outbreeding, d. Combinations of these to accomplish objectives 1, 2, and 3; (5) study productiveness of existing or introduced stocks of beef cattle.

Contributing projects: Ala., Ark., Fla., Ga., Ky., La., Md., Miss., N. C., S. C., Tenn., Texas, Va. (All projects in I.)

(See also, Miss. II-B, W. Va. II-B.)

W-1 The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop lines of established beef cattle breeds that will be useful in the improvement of economically important characteristics such as weaning weight, rate of gain, economy of gain, carcass composition, fertility, and longevity; (2) develop selection criteria and selection and breeding techniques which will be effective in the derivation of productive lines of beef cattle; (3) study the inheritance of specific genes and factor interactions; (4) determine the genetic causes of decline in vigor, size, fertility, and other characteristics of inbred lines that have been or may be established; (5) study the adaptation of lines of beef cattle of known genetic merit to new environments; (6) introduce and test new or derived breeds or types of beef cattle.

Contributing projects: Ariz., Calif., Colo., Hawaii, Idaho, Mont., Nev., N. Mex., Oreg., Utah, Wash., Wyo. (All projects in I.)

W-34 Range Livestock Nutrition. To determine the quantitative and qualitative nutritive value of range forage consumed in terms of chemical analysis, botanical classification, soil, site, stage of maturity, season, drouth, and digestibility relating these factors to reproductive performance, growth and market value of range cattle and sheep.

Contributing projects: Calif., Colo., Hawaii, Idaho, Mont., Nev., N. Mex., Oreg., Utah, Wash., Wyo. (All projects in III-B.)

W-46 The Effects of Environmental Stresses on Range Cattle and Sheep Production. To (1) test physiological measures as suitable criteria in the evaluation of stresses resulting from nutrient restriction, altitude and temperature; and (2) develop economical methods of alleviating the stresses of nutrient restriction, altitude and temperature on growth and reproduction of range cattle and sheep.

Contributing projects: Ariz., Calif., Colo., Idaho, Nev., N. Mex., Oreg., Utah. (All projects in II-A.)

(See also Section b: Sheep -- Mont. II-B, Wyo. II-B.)

W-49 Physiological Causes of Breeding Failure in Cattle. To (1) develop or adapt methods for assay of hormone secretion and excretion; (2) characterize morphology and biochemistry of organs and tissues concerned with reproduction; (3) determine the relationship of hormonal and anatomical characteristics with reproductive status; and (4) evaluation of controlled therapy.

Contributing projects: Colo., Idaho, Nev., Wash. (All projects in II-B.)

(See also Part 5, DAIRY CATTLE -- Calif., Mont., Oreg., Wash.) (All projects in VI.)

OTHER REGIONAL RESEARCH PROJECTS REFERRED TO IN THIS SUMMARY BUT SUMMARIZED ELSEWHERE

NC-23	*Requirements and Design of Structures and Related Equipment for Unified Farmstead Operations.* See Part 3, Section C.
NC-47	*Evaluation of Breeding Systems for Chickens.* See Part 19.
NE-1	*Causes and Prevention of Reproductive Failure in Dairy Cattle.* See Part 5.
NE-13	*The Mechanization of Forage Crop Harvesting, Processing, Storing, and Feeding.* See Part 3, Section b.
NE-24	*The Nutritive Evaluation of Forages.* See Part 10.
NE-41	*Endocrine Factors Affecting Reproduction and Lactation in Dairy Cattle.* See Part 5.
S-12	*Production and Evaluation of Forage Crops and Pastures in the South.* See Part 10.
S-21	*Gastro-intestinal Parasites of Ruminants.* See Part 23.
S-27	*An Economic Evaluation of Forage Production and Use on Beef and Dairy Farms.* See Part 14, Section a.
SM-19	*Motivating Factors in Consumer Purchases of Beef.* See Part 14, Section c.
W-4	*Nutritional Status of Population Groups in Selected Areas of the West.* See Part 13, Section a.

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8: Part Numbers	Subject-Matter Area	Title of Section
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Commodities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Microbiology, Sanitation & Public Health b. Food Engineering, Processing, Product and Process Development, Utilization and Waste Disposal c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8: Part Numbers	Subject-Matter Area	Title of Section
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classification
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control